DEPARTMENT OF ELECTRONIC ENGINEERING, TU DUBLIN (Tallaght)

ENGINEERING ANCILLARY SAFETY STATEMENT 2019

Introduction: Departmental Statement on Safety

It is a prime objective of the Electronic Engineering Department (TU Dublin - Tallaght) to achieve and sustain high standards of health and safety so far as is reasonably practicable. This requires, at a minimum, conforming to the requirements of Irish legislation as it pertains to Occupational Health and Safety.

The Electronic Engineering Department (TU Dublin - Tallaght) will strive to do all that is reasonably practicable to prevent personal injury as well as damage to property, foreseeable following proper risk assessment and hazard identification in respect of Departmental resources.

In particular the Department recognises its responsibility in respect of safety and commits to:

- *Provide/maintain safe and healthy working conditions,in-line with of statutory requirements.*
- *Provide necessary training and instruction to enable staff to perform their work safely and effectively.*
- *Make available necessary safety devices/protective equipment and supervising their use.*
- *Maintain a constant and continuing interest in health and safety matters pertinent to the Engineering Department*
- *Keep this Safety Statement and other safety documents under review.*

This report presents a risk assessment and control framework relating to laboratory equipment items currently in use the various laboratories of the Electronic Engineering Department at TU Dublin - Tallaght. Hazards and risks are identified and processed on a per equipment ref/model basis. The Department of Electronic Engineering has multiple instances of equipment items (e.g. oscilloscopes) in various laboratories and consequently, some risk evaluations may pertain to multiple items across a number of laboratories. Laboratories inventories are included in this document.

This report is structured as follows;

Section 1: *Staff Health and Safety Responsibilities*

Section 2: *Training*

Section 3: *General Laboratory/Workshop Safety*

Section 4: *Department of Electronic Engineering Laboratories and Workshops.*

Section 5: *Laboratory Inventories and Risk Assessment/Control Data (inc. Standard Operating Procedures)*

Section 6: *Risk and Control Assessment and Standard Operating Procedures (SOPs) in respect of the temporary re-designation of Lab17A for the purpose of prototype development by Nines Photovoltaics.*

1. Staff Health and Safety Responsibilities

Staff should familiarise themselves, where applicable, with the contents of Material Safety Data sheets (M.S.D.) a copies of which are available from the relevant Engineering Technician.

Staff are requested to read the Safety, Health and Welfare at work act, 2005, a copy of which is available in the University library. Attention is drawn to section 13 and 14 of this Act.
The general duties of employees, as outlined in the act are as follows;

> ***13.***—*(1)An employee shall, while at work—(a) comply with the relevant statutory provisions, as appropriate, and take reasonable care to protect his or her safety, health and welfare and the safety, health and welfare of any other person who may be affected by the employee's acts or omissions at work,*
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> *(b) ensure that he or she is not under the influence of an intoxicant to the extent that he or she is in such a state as to endanger his or her own safety, health or welfare at work or that of any other person,*
>
> *(c) if reasonably required by his or her employer, submit to any appropriate, reasonable and proportionate tests for intoxicants by, or under the supervision of, a registered medical practitioner who is a competent person, as may be prescribed,*
>
> *(d) co-operate with his or her employer or any other person so far as is necessary to enable his or her employer or the other person to comply with the relevant statutory provisions, as appropriate,*
>
> *(e) not engage in improper conduct or other behaviour that is likely to endanger his or her own safety, health and welfare at work or that of any other person,*
>
> *(f) attend such training and, as appropriate, undergo such assessment as may reasonably be required by his or her employer or as may be prescribed relating to safety, health and welfare at work or relating to the work carried out by the employee,*
>
> *(g) having regard to his or her training and the instructions given by his or her employer, make correct use of any article or substance provided for use by the employee at work or for the protection of his or her safety, health and welfare at work, including protective clothing or equipment,*
>
> *(h) report to his or her employer or to any other appropriate person, as soon as practicable—*
>
> *(i) any work being carried on, or likely to be carried on, in a manner which may endanger the safety, health or welfare at work of the employee or that of any other person,*

(ii) any defect in the place of work, the systems of work, any article or substance which might endanger the safety, health or welfare at work of the employee or that of any other person, or

(iii) any contravention of the relevant statutory provisions which may endanger the safety, health and welfare at work of the employee or that of any other person, of which he or she is aware.

(2) An employee shall not, on entering into a contract of employment, misrepresent himself or herself to an employer with regard to the level of training as may be prescribed under subsection (1)(f).

***14.**—A person shall not intentionally, recklessly or without reasonable cause—*

(a) interfere with, misuse or damage anything provided under the relevant statutory provisions or otherwise for securing the safety, health and welfare of persons at work, or

(b) place at risk the safety, health or welfare of persons in connection with work activities.

In the case of practical demonstrations or practical classes, the University takes the view that while the student, whether full-time or part time, is under the supervision of a staff member, that the staff member in question is responsible, in so far as is practicable, for the safety and welfare of that student. In the instance where there may exist more than one staff member present at student practicals in a supervisory capacity, the primary responsibility for safety in the laboratory situation rests with the main or lead supervisor.

Students also have an obligation to comply with all lawful directives issued by staff in pursuant of good and safe practice within a laboratory/workshop environment and to ensure that they work in a safe manner, adopting any/all precautions communicated to them. It is a condition of laboratory use, that students agree to observe all TU DUBLIN procedures and to report all accidents/incidents immediately to a responsible member of staff.

In the case of laboratory work performed by postgraduate students, the safety of such students is the responsibility of the local academic staff supervisor. The University takes the view that preparations, formulations, purification's, analyses, experimental procedures etc. performed by postgraduate students, arising from laboratory-based research, has received prior sanction from the academic supervisor, with due consideration being given to the safety and welfare of such students and others associated with, or in the vicinity of, such activities. In addition, all reasonably practicable measures to identify, minimise, and where possible, eliminate hazards associated with postgraduate laboratory-based research activities must be undertaken by the local academic staff supervisor and other competent members of staff.

2. Training

The training of a person to perform a particular job or task is accepted to carry the implication that he/she is being trained to do the job safely. All staff employed by the Electronic Engineering Department (TU Dublin - Tallaght) will receive induction training to ensure that they fully understand the hazards to which they may be exposed and the safety precautions and emergency procedures required. Training will be given, as appropriate, in the items listed below, as well as in the safe use of machinery, equipment, first aid and material handling. This training will be provided to staff involved in activities, which necessitate such training. The department detailed in parentheses is responsible for the delivery of initial, and refresher, courses in the following areas;

- Engineering Ancillary Safety Statement (Engineering Department)
- Use of Personal Protective Equipment (H.R. Department)
- Use of Equipment, Machinery and Materials (Engineering Department)
- Waste Disposal Procedures (Engineering Department)
- Fire Safety (H.R. Department)
- Accident and Emergency Procedures (H.R. Department)
- Safe Manual Handling (H.R. Department)

Any training provided will meet the requirements of appropriate legislation, standards or guidelines and will be delivered by qualified instructors. (Laboratory personnel or external training organisations as appropriate) Safety training records will be maintained by the Human Resources manager and will contain the following information:

1. Date of instruction or exercise;
2. Duration;
3. Name of instructor;
4. Name of person receiving instruction;
5. Nature and content of instruction.

3. General Laboratory Safety

The following rules are to be observed in the laboratory at all times:

(1) Work in the laboratory is permitted only during authorised time periods.

(2) Where required appropriate protective clothing must be worn.

(3) Eating, drinking and smoking in laboratories and workshops are strictly forbidden.

(4) Avoid all naked flames when handling inflammable materials.

(5) Long hair must be properly tied and a safety hair net worn when operating machinery or equipment with rapidly moving or rotating parts.

(6) Safety goggles must be worn when performing tasks that may result in eye injury.

(7) Standard Operating Procedures (SOP) must be employed when performing tasks and/or processes deemed to carry an increased level of risk. SOPs associated with particular laboratories or work-areas are available from the technical officer responsible for the laboratory or work-area.

(8) Laboratory users are required to make themselves aware of the location of the laboratory First Aid Kit(s), Eye-Wash Station, fire alarm and fire extinguisher. All accidents and/or incidents are required to be reported immediately to the laboratory supervisor or responsible technical officer. Where required, medical attention must be sought immediately and an accident/incident report form completed and submitted to the laboratory technical officer by the supervising member of staff. Accident/Incident report forms are available from the laboratory technical officer.

(9) Non-qualified persons (e.g. undergraduate students) must be supervised by a suitably-qualified member of staff when operating hazardous machinery, equipment and/or materials.

(10) All work areas must be kept clean and tidy. All laboratory users are required to return all tools, equipment, furniture and materials to their proper place of storage and to properly dispose of any waste materials, prior to leaving the laboratory.

(11) Laboratory users are required to observe, and to comply with, all instructions or directions issued by the laboratory supervisor and/or technical officer for the purposes of maintaining an orderly and safe working environment. All laboratory users are strongly advised to wash their hands following working in the laboratory.

4. Electronic Engineering Laboratories/Workshops (TU Dublin – Tallaght)

The following laboratory areas are managed and maintained by the Department of Electronic Engineering. Standard Operating Procedures, inventory listings and hazard control sheets are held on record and are available on request.

Semiconductor and Microelectronics Laboratory – Lab 017

The microelectronics laboratory is a self-contained purpose built cleanroom facility which specialises in the fabrication of semiconductor devices and micro solid-state structures. All of the necessary hardware is available to carry out fundamental fabrication techniques on silicon wafers including, cleaning, oxidation, diffusion, metallisation, lithographic patterning and chemical etching. In addition, the use of various test and measurement equipment, in conjunction with software tools, facilitate mid and post process device analyses.

Control and Energy Systems Laboratory – Lab 017A

Control Theory is an essential component of many branches of engineering which deals with the behaviour of complex dynamic systems in terms of input/output response and stability. The Control and Energy Systems Laboratory is a 20-station facility where students, through access to a wide range of instructional systems and software, develop skills in this key area of engineering. The activities of this laboratory are augmented by the provision of a fully-operational wind-turbine control system which is used to support the Department's academic energy programmes.

Note: *this laboratory has been temporarily designated as a prototyping laboratory for Nines Photovoltaics and as such is not currently an area affording common access to staff and/or students. See appendix for risk assessment and SOPs.*

Computer-Based Design and Modelling Laboratories – Labs 208, 209, 212 & 218

Shared with the Department of Mechanical Engineering, the System Modelling and Design laboratories represent a vital component of the overall strategy of the Department. The importance of such laboratories to the Department's mission is highlighted by the continual review, expansion and upgrade of associated hardware and software resources. The Systems Modelling and Design Laboratories provide over 120 high-specification, networked desktops and workstation supported by a local engineering server and networking infrastructure which provides authentication, application, licensing and file-storage services.

Digital Systems Laboratory - Lab 215

The facilities in this laboratory support undergraduate and postgraduate education in the area of Digital Systems construction and design. The resources of Lab 215 support all digital electronics modules in the Department's academic programmes from basic Boolean circuits, logic analysis, field programmable gate arrays and advanced microcontroller applications for embedded systems.

Analogue Systems Laboratory – Lab 217

The Analogue Electronics Laboratory facilitates instruction and experimental undergraduate and post-graduate work in the specialist areas of Analogue Electronics, Control Systems, PCB Surface Mount Technology and Fibre Optics. The laboratory consists of 20 workstations typically used for the design, test and debug of analogue circuits and electronic control systems.

Communications Systems Laboratory – Lab 219

The Communication Systems Laboratory facilitates experimental study in the specialist area of electronic communications systems (telecommunications and datacommunications). Through the provision of state-of-art equipment and continued collaboration with industry, the Communications Systems laboratory enhances the Department's academic and research programmes by offering students hands-on, relevant experience in the areas of wired, and wireless, communications systems design and operation. The laboratory has three main areas of focus: Radio Frequency Transmission, Digital Communications and Data Communications Networks and is fully equipped with a broad range of instruments and systems from industry-leading manufacturers.

Projects Laboratory – Lab 221

The facilities in this laboratory support undergraduate, final-year project work.. The laboratory is equipped with 15 workstations, each of which includes a networked PC (running standard and specialised application software) and high-specification electronics test and measurement instruments. Lab 221s reserved soley for use of final year undergraduate and electronic engineering students and provides an active, student-centred working environment where on-going experimental work, as well as supervisor-student meetings, can take place.

Technician Development Centre (TDC)

The Technical Development Centre (TDC) is an off-campus facility jointly managed by the Departments of Electronic and Mechanical Engineering at TU Dublin – Tallaght. Educational facilities and resources at the TDC continue to be developed in order to provide a centre of educational and research excellence, primarily in the area of electric power engineering. In particular, emphasis is placed upon energy efficiency and innovation. The TDC is very much a hands-on practical facility with a large state-of-art workshop, surrounded by supporting laboratories, classrooms, offices and stores.

Radio Frequency Technology Laboratory (RFT)

The Radio Frequency Technology Lab and Anechoic Chamber are located in the University's Synergy and CASH buildings respectively at TU Dublin - Tallaght. Both resources are coordinated by the Department's RF Technology Group and are provided to support radio frequency applied research services to companies (commercial and start-up) as well as other academic institutions through collaboration and partnership projects. The RFT lab houses a suite of state-of-art communications systems testing equipment.

Anechoic Chamber (AEC)

The Anechoic Chamber (AEC) complements the Radio Frequency Laboratory (RFT) and provides an EMF and acoustical isolation chamber for the purposes of testing RF prototype devices and systems.

5. Laboratory Inventories and Risk Assessment/Control Data

This section of the report details equipment inventory listing (model and serial) for each of the laboratories outlined in section 4.0 above, as well as risk assessment and control data.

In respect of risk assessment, the model reference is used to track risk associated with equipment items and is quantified using the risk assessment template shown below in figure 5.1.

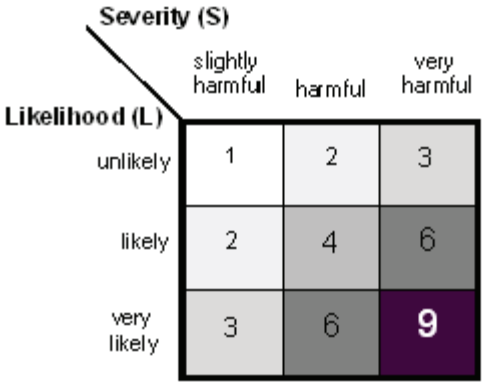
Overview, Definitions and Risk Evaluation Template

1. ***Likelihoods*** of hazard occurrence, Existing-***EL*** and Revised-***RL,*** defined for normal operation.

2. ***Severity*** (***S***) indicates the degree of damage/injury resulting from the occurrence of a hazard.

3. ***Existing Risk*** (***ER***) associated with a hazard = Existing Likelihood (***EL***) x Severity (***S***)

4. ***Revised Risk*** (***RR***) = risk *AFTER* recommended control implementation = (***RL***) x (***S***).



Risk Rating Evaluation Key

1 =slightly harmful hazard unlikely to occur.
2 =slightly harmful/(harmful hazard), likely/(unlikely) to occur.
3 =slightly harmful/(very harmful) hazard very likely/(unlikely) to occur.
4 =harmful hazard likely to occur.
6 =harmful/(very harmful) hazard very likely/(likely) to occur.
9 =very harmful hazard very likely to occur.

Figure 5.1
Risk Assessment Template

Slightly Harmful	Harmful	Very Harmful
► *superficial injuries*	► *lacerations*	► *amputation*
► *minor cuts & bruises*	► *burns*	► *major fractures*
► *eye irritation from dust*	► *concussion*	► *poisoning*
► *nuisance & irritation*	► *serious sprains*	► *fatal injuries*
► *temporary discomfort*	► *minor fractures*	► *occupational cancer*
	► *dermatitis*	► *severe life-shortening disease*
	► *asthma*	► *deafness*
	► *minor disability*	► *fatal disease*
		► *head injuries*
		► *eye injuries*

Table 5.1 Sample definitions of harmfulness (slightly harmful / harmful / very harmful).

5.1 Semiconductors Laboratory (Lab 017) Inventory Summary (Active Items)

Item	Manufacturer	Model	Quantity
Vacuum Pump	Gast	0523-703Q-ER32X	1
Spinner Vacuum Pump	Unknown	23 Series	1
Source Meter	Keithley	2400	2
High Voltage Supply	Keithley	247	1
Data Acquisition	National Instruments	2700	1
Digital Multimeter	Hewlitt Packard	34401A	1
Semiconductor Parameter Analyzer	Unknown	4155C	1
Picoameter	Keithley	6485	1
FTIR	Varian	660-IR	1
Computer (PC)	Acer	Acer200	2
Solar Panel Inverter	Studer	AJ Inverter	1
Sputter Coater	Edwards	Auto 500	2
Acid Wet Bench	Unknown	AWB1	1
Three Stack Furnace	Unknown	Birles 'C'	1
Breathing Apparatus	Scott	Cen-PaQ	2
Contact Angle Tensiometer	FTA	DCA-100	1
DI Water System	Unknown	DIWS1	1
Microscope	Lecia	DMLM	1
LAN/GPIB gateway	Agilent	E5810A	1
Environmental cabinet	Rayair	EnvCab1	1
Spectroscopic Ellipsometer	Sopralab	GES-5E	1
Computer (PC)	Dell Computers	GX280	1
Computer (PC)	Hewlett Packard	Hp Compaq 6005 Pro	1
HVAC System	Unknown	HVAC1	1
Low speed Saw	Buehler	ISOmet	1
Chiller	ATC	K4	1
Overhead Projector	Philips	LC4331	1
Hybrid Fume Extract	Unknown	MCS-11-120	1

Item	Manufacturer	Model	Quantity
Microscope	Wentworth Labs	MCSWL1	1
Mass Flow Controllers	MKS	MFC1	1
Light Source	Fibreoptics Technology Inc.	MO150	1
Power Supply Unit	Unknown	MPPS6	11
Hotplate	Yellowline	MST Basic C	2
Solar Panel Charge Controller	Outback Power Systems	MX-60MPPT	1
Chiller	Haake	N3	1
Computer (PC)	Dell	Optiplex 330	1
Computer (PC)	Dell	Precision T3400	1
Sputter Coater	Kurt J Lesker	PVD 75	1
Mask Aligner	Unknown	Q4000	1
Power Supply Unit	Rapid	RAPID017	1
Hot Plate	Stuart	SD 160	1
Eprom Programmer	Unknown	Series II 200	3
Solvent Fume Cupboard	Unknown	SFC1	1
Vacuum Pump	Edwards	Speedivac 2	1
Black & White Monitor	Sony	SSM-125CE	1
Heat Bar Control Box	Unknown	TK294	12
Instrumentation Module	Unknown	TK2941A	12
UV light source	Quintel	Ultra Sense	1
Anti-vibration Table	Kinetic Systems	Vibraplane	1
Wafer Spinner	Unknown	WS-400A	2
Wafer Spinner	Laurell	WS-400B-6NPP	1
Gas Alarm	Honeywell	Zareba Touchpoint 4	1

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	GX150	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	GX260	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.Check for power cable d	1	2	2	1	2
Elec-221-John Byrne	571	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified not to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications.MCB circuits used in Lab.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	2	4	2	1	2
Elec-219-John Byrne	GX150	Electrical (high current).	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	3	3	0	0

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	GX260	Electrical (high current).	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	3	3	0	0
Elec-219-John Byrne	571	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	2	4	2		
Elec-218-Damian Cahill	GX280	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2
Elec-218-Damian Cahill	Hp Compaq 6005 Pro	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2
Elec-17A-Paul Tierney	0523-703Q-ER32X	None	None	None	0	0	0	0	0
Elec-17A-Paul Tierney	247	Electrical - high current	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	6	3	1	3
Elec-17A-Paul Tierney	2700	None	None	None	0	0	0	0	0

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-17A-Paul Tierney	34401A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB. Unit rack-mounted and not accessible to students.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-017-Paul Tierney	4155C	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB. Unit rack-mounted and not accessible to students.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-17A-Paul Tierney	6485	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-17A-Paul Tierney	91019-20B	None	None	None	0	0	0	0	0
Elec-17A-Paul Tierney	91024-20	None	None	None	0	0	0	0	0
Elec-017-Paul Tierney	Acer200	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	AJ Inverter	Electrical - improper use may lead to injury.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-17A-Paul Tierney	2400	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB. Unit rack-mounted and not accessible to students.	None	1	2	2	1	2
Elec-017-Paul Tierney	BYT8051ADC	None	None	None	0	0	0	0	0
Elec-017-Paul Tierney	BYT8051DEVBRD	None	None	None	0	0	0	0	0
Elec-017-Paul Tierney	BYT8051OPDRV	None	None	None	0	0	0	0	0
Elec-17A-Paul Tierney	BYT8051PRTMT	None	None	None	0	0	0	0	0
Elec-17A-Paul Tierney	BYT8051SCRTR	None	None	None	0	0	0	0	0
Elec-17A-Paul Tierney	BYT8051TRBRD	None	None	None	0	0	0	0	0
Elec-17A-Paul Tierney	BYTPCS017	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB. Unit rack-mounted and not accessible to students.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-17A-Paul Tierney	BYTPLC017	None	None	None	0	0	0	0	0
Elec-17A-Paul Tierney	BYTRTU017	None	None	None	0	0	0	0	0
Elec-17A-Paul Tierney	BYTSCU017	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-17A-Paul Tierney	BYTTCU017	None	None	None	0	0	0	0	0
Elec-017-Paul Tierney	Cen-PaQ	None	None	None	0	0	0	0	0
Elec-17A-Paul Tierney	DCA-100	None	None	None	0	0	0	0	0

Risk Assessments for Lab 017 TU Dublin - Tallaght 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-17A-Paul Tierney	DIWS1	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-17A-Paul Tierney	DMLM	None	None	None	0	0	0	0	0
Elec-17A-Paul Tierney	E5810A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Technical staff only permitted to service item.	1	2	2	1	2
Elec-017-Paul Tierney	EnvCab1	Mechanical - high temperature.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	1	1	1	1	1
Elec-017-Paul Tierney	GES-5E	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-17A-Paul Tierney	ISOmet	Mechanical - cutting tool	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	K4	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-17A-Paul Tierney	Latitude	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	MCS-11-120	Chemical - fumes	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	1	1	1	1	1
Elec-017-Paul Tierney	MCSWL1	None	None	None	0	0	0	0	0
Elec-017-Paul Tierney	Metaserv	Mechanical - high speed moving parts	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	1	1	1	1	1
Elec-017-Paul Tierney	MFC1	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	MO150	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	MPPS6	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	MST Basic C	Mechanical - high temperature.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	2	1	1	1

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-17A-Paul Tierney	MX-60MPPT	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	N3	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	Optiplex 330	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-17A-Paul Tierney	Precision T3400	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	PVD 75	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB. Unit rack-mounted and not accessible to students.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	PVD 75	RF Power - Potentially high levels of RF radiation if unit is damaged.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	6	3	1	3

Risk Assessments for Lab 017 TU Dublin - Tallaght 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-017-Paul Tierney	RAPID017	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	SD 160	Mechanical - high temperature.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	1	1	1	1	1
Elec-17A-Paul Tierney	Series II 200	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	TK294	Mechanical - high temperature.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	TK2941A	None	None	None	0	0	0	0	0
Elec-017-Paul Tierney	UL500	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	Vibraplane	Mechanical - heavy equipment	Only users instructed in the proper use of the instrument are permitted to use the item.	None	1	1	1	0	0
Elec-017-Paul Tierney	WS-400A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2

Risk Assessments for Lab 017 TU Dublin - Tallaght 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-017-Paul Tierney	WS-400B-6NPP	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	Zareba Touchpoint 4	Chemical - fumes	Constant electronic monitoring with alarm.	Regular inspection and test.	1	2	2	1	2
Elec-017-Paul Tierney	AWB1	Chemical - acidic substance (Hydrofluouric acid). Prolonged acid storage within the bench.	Bath is under lock and key, access to authorised personnel only.	None	1	3	3	1	3

STANDARD OPERATING PROCEDURE

Organisation: **TU Dublin - Tallaght**

Section: **School of Engineering**

Procedure Name:	**Code of Conduct within Engineering Laboratory Microelectronics Laboratory 017**
Procedure No:	**E2078**
Revision:	**A**
Prepared By:	**Paul Tierney**
Date:	**04/10/10**
Approved By:	**James Wright**
Date:	**22/10/10**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A	-	Immediate	04/10/10 PT	22/10/10 JW	Initial Release

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of the microelectronics laboratory *017*, that all users must comply with the standard operating procedures specified below which govern the safe use of particular laboratory resources/processes deemed to carry a risk associated with their use. These procedures are available from the technical officer responsible for the laboratory.

E2079 Furnace Use

E2080 Acid Bench Use

E2081 Solvent Bench Use

E2082 HF Preparation

E2083 HF Neutralization & Storage

E2084 HF Silicon Wafer Cleaning

6.16 After an initial staff lead tour of the facility it is a condition of use of the microelectronics laboratory 017 that all users must have completed the MSDS safety quiz. Also users must read the laboratory safety manual and have completed a quiz on it. A score of 80% or higher must be achieved in both quizzes to gain ongoing access to the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

STANDARD OPERATING PROCEDURE

Organisation: **TU Dublin - Tallaght**

Faculty: **SCHOOL OF ENGINEERING**

Procedure Name:	**Furnace Use**
Procedure No:	**E2079**
Revision:	**A**
Prepared By:	**Paul Tierney**
Date:	**04/10/10**
Approved By:	**James Wright**
Date:	**14/10/10**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A		4/10/10	4/10/10 PT	14/10/10 JW	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that the furnace in the microelectronics laboratory is used in a safe manner.

2.0 PURPOSE

The purpose of this procedure is to outline to staff a safe method of (a) inserting wafers and removing them from the furnace, (b) checking the furnace temperature from inside the laboratory and (c) allowing items from the furnace to cool before handling.

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

Furnace – Three Stack Silicon Wafer Oxidation furnace fitted with quartz glass heating tubes

5.0 RESPONSIBILITY

It is the responsibility of Head of the School of Engineering and the Head of the Department of Electronic Engineering to ensure compliance to this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Only competent staff members should operate the furnace or directly supervise undergraduate students.

6.2 Users must be aware that during processing tube temperatures can reach 1150°C and surfaces can be extremely hot.

6.3 Wafers must be loaded or unloaded from the furnace in a quartz boat using the loading tray.

6.4 When pushing boats into or extracting them from the furnace the quartz rods in holders mounted on the wall to the right of the furnace door must be used.

6.5 When a rod has been in the furnace upon extraction users must never hold the rod at or near a section that was inserted as it will be hot. It should be placed back in its holder and allowed to cool.

6.6 Upon extraction the silicon wafers and the boats must be allowed to cool fully before handling.

6.7 The temperature probe beside the furnace should be inserted to check the tube temperature from within the laboratory. Be aware this could also be hot when removed and should be inserted in its holder and allowed to cool.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

Appendices

Refer to Nifast General Risk Assessments Manual which is retained in the press in the gowning area to see the risk assessment for furnace use

STANDARD OPERATING PROCEDURE

Organisation: **TU Dublin - Tallaght**

Faculty: **SCHOOL OF ENGINEERING**

Procedure Name:	**Acid Bench Use**
Procedure No:	**E2080**
Revision:	**A**
Prepared By:	**Paul Tierney**
Date:	**04/10/10**
Approved By:	**James Wright**
Date:	**14/10/10**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A		4/10/10	4/10/10 PT	14/10/10 JW	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that the acid bench in the microelectronics laboratory is used in a safe manner.

2.0 PURPOSE

The purpose of this procedure is to outline to staff a method of (a) safely handling chemicals and (b) ensuring the bench is left in a safe manner and functioning correctly.

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

MSDS – Material Safety Data Sheets specific to a particular chemical informing the reader of general precautions, information on storage, disposal, environmental effects and emergency procedures in the event of exposure etc. where applicable to that chemical.

DI Water – Deionized water which is on tap in the acid bench.

5.0 RESPONSIBILITY

It is the responsibility of Head of the School of Engineering and the Head of the Department of Electronic Engineering to ensure compliance to this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Ensure you have read the appropriate MSDS sheets and understand all the necessary precautions for the chemicals being used. A folder containing all the MSDS sheets is retained in the press in the gowning area. A Nifast risk assessment manual for procedures carried out at the bench is available there also.

6.2 Undergraduate students should not work at the acid bench without the supervision of a staff member.

6.3 If working with Hydrofluoric Acid (HF) the relevant SOP for the procedure must be read. These are located in the same press as the MSDS sheets.

6.4 All open containers of acids must be kept under the fume extraction hood.

6.5 Used acids should be appropriately neutralized and/or diluted prior to storage in the marked waste containers in the acid storage cabinet.

6.6 The bench surface must be washed down with DI water after use.

6.7 Litmus paper is available on the top of the bench to check the pH level of any liquids on the bench.

6.8 Should the fume extract stop functioning the lab should be evacuated and the technician informed immediately.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

Appendices

Refer to the Nifast General Risk Assessments Manual which is retained in the press in the gowning area to see the risk assessment for handling corrosives at the acid bench.

STANDARD OPERATING PROCEDURE

Organisation:

TU Dublin - Tallaght

Faculty:

SCHOOL OF ENGINEERING

Procedure Name:	**Solvent Bench Use**
Procedure No:	**E2081**
Revision:	**A**
Prepared By:	**Paul Tierney**
Date:	**04/10/10**
Approved By:	**James Wright**
Date:	**14/10/10**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A		4/10/10	4/10/10 PT	14/10/10 JW	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that the solvent bench in the microelectronics laboratory is used in a safe manner.

2.0 PURPOSE

The purpose of this procedure is to outline to staff a method of (a) safely handling chemicals and (b) ensuring the bench is left in a safe manner and functioning correctly.

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

MSDS – Material Safety Data Sheets specific to a particular chemical informing the reader of general precautions, information on storage, disposal, environmental effects and emergency procedures in the event of exposure etc. where applicable to that chemical.

IPA Wipes – Isopropanol Alcohol soaked wipes for general laboratory cleaning use.

5.0 RESPONSIBILITY

It is the responsibility of Head of the School of Engineering and the Head of the Department of Electronic Engineering to ensure compliance to this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Ensure you have read the appropriate MSDS sheets and understand all the necessary precautions for the chemicals being used. A folder containing all the MSDS sheets is retained in the press in the gowning area. A Nifast risk assessment manual for procedures carried out at the bench is available there also.

6.2 Undergraduate students should not work at the solvent bench without the direct supervision of a staff member.

6.3 All open containers of chemicals must be kept within the fume extraction hood.

6.4 All disposable items contaminated with solvent waste such as pipettes or IPA wipes must be disposed off in the solvent waste bin in the extract hood.

6.5 Solvent chemical waste must be transferred to the labeled waste containers in the solvent storage cabinet.

6.6 Should the fume extract stop functioning the lab should be evacuated and the technician informed immediately.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

Appendices

Refer to the Nifast General Risk Assessments Manual which is retained in the press in the gowning area to see the risk assessments for working with solvents.

STANDARD OPERATING PROCEDURE

Organisation:

TU Dublin - Tallaght

Faculty:

SCHOOL OF ENGINEERING

Procedure Name:	**HF Preparation**
Procedure No:	**E2082**
Revision:	**A**
Prepared By:	**Paul Tierney**
Date:	**04/10/10**
Approved By:	**James Wright**
Date:	**14/10/10**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A		4/10/10	4/10/10 PT	14/10/10 JW	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that the preparation Hydrofluoric Acid (3.5% solution) in the microelectronics laboratory is done so in a safe manner.

2.0 PURPOSE

The purpose of this procedure is to outline to staff a method of (a) understanding the risks and precautions required when dealing with Hydrofluoric Acid (HF), (b) safely preparing the solution and (c) ensuring the acid bench is left in a safe condition afterwards

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

MSDS – Material Safety Data Sheets specific to a particular chemical informing the reader of general precautions, information on storage, disposal, environmental effects and emergency procedures in the event of exposure etc. where applicable to that chemical.

PPE – Personal Protective Equipment - such as gloves, glasses etc.

5.0 RESPONSIBILITY

It is the responsibility of Head of the School of Engineering and the Head of the Department of Electronic Engineering to ensure compliance to this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 This procedure should be carried out only by staff members. It is recommended a second person is present.

6.2 Ensure you have read the MSDS sheet and understand the precautions necessary with this dangerous chemical.

6.3 Ensure HF antidote gel is located on top of the acid bench and ensure the emergency shower and eyewash station are in the laboratory are functioning correctly.

6.4 Appropriate PPE is located in the chase area behind the acid bench. This must be worn by anyone in the vicinity of the acid. This consists of the regular laboratory PPE, though two pairs of latex gloves should be worn, along with an apron, face visor and elbow length rubber gauntlets. The condition of all gloves should be checked thoroughly.

6.5 The cover over the HF bath area in the acid bench should be opened and the water portion of the solution added to the container. It is assumed the previous HF solution has already been disposed off and the container rinsed as outlined in the relevant SOP, if not this must be carried out initially.

6.6 The Hydrofluoric Acid (35% solution) should now be removed from the storage cabinet and placed on the acid bench under the fume hood. The desired amount should be poured into a plastic graduated cylinder, no glassware should be used. The lid be securely closed on the HF (35% solution) and the container left under the fume hood.

6.7 The contents of the graduated cylinder should carefully be added to the water portion of the final solution avoiding any splashing. The lid on the HF bath should be closed.
6.8 The graduated cylinder should now be rinsed thoroughly in the rinse bath in front of the HF bath. Water should be poured into this bath continuously for 3 minutes.
6.9 The HF (35% solution) should be returned to the storage cabinet.
6.10 The acid bench should be thoroughly rinsed down with water as should your gauntlets. Litmus paper is on top of the bench to check the pH of any droplets on the bench.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

STANDARD OPERATING PROCEDURE

Organisation:

TU Dublin - Tallaght

Faculty:

SCHOOL OF ENGINEERING

Procedure Name:	**HF Neutralization and Storage**
Procedure No:	**E2083**
Revision:	**A**
Prepared By:	**Paul Tierney**
Date:	**04/10/10**
Approved By:	**James Wright**
Date:	**14/10/10**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A		4/10/10	4/10/10 PT	14/10/10 JW	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that the handling of Hydrofluoric Acid (3.5% solution) in the microelectronics laboratory is done so in a safe manner

2.0 PURPOSE

The purpose of this procedure is to outline to staff a method of (a) understanding the risks and precautions required when dealing with Hydrofluoric Acid (HF), (b) safely removing the solution from the bench, neutralizing and storing it for disposal (c) ensuring the acid bench is left in a safe condition afterwards

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

MSDS – Material Safety Data Sheets specific to a particular chemical informing the reader of general precautions, information on storage, disposal, environmental effects and emergency procedures in the event of exposure etc. where applicable to that chemical.

PPE – Personal Protective Equipment - such as gloves, glasses etc.

5.0 RESPONSIBILITY

It is the responsibility of Head of the School of Engineering and the Head of the Department of Electronic Engineering to ensure compliance to this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 This procedure should be carried out only by staff members. It is recommended a second person is present.

6.2 Ensure you have read the MSDS sheet and understand the precautions necessary with this dangerous chemical.

6.3 Ensure HF antidote gel is located on top of the acid bench and that the emergency shower and eyewash station in the laboratory are functioning.

6.4 Appropriate PPE is located in the chase area behind the acid bench. This must be worn by anyone in the vicinity of the acid. This consists of the regular laboratory PPE, though two pairs of latex gloves should be worn, along with an apron, face visor and elbow length rubber gauntlets. The condition of all gloves should be checked thoroughly.

6.5 The cover over the HF bath area in the acid bench should be opened and the plastic jug containing the HF should be very carefully lifted out of the bath and placed on the bench still under the fume extraction hood. Gloves should be checked very carefully and rinsed as a precaution.

6.6 Under the fume extraction hood the HF solution should be carefully poured into a larger plastic container marked suitable for HF to allow for neutralization. This is done using a one molar Sodium Carbonate solution which is added to the HF solution carefully observing the reaction and checking pH levels.

6.7 When the solution has been sufficiently neutralized and still working under the fume extraction hood it should be transferred to the marked HF waste container and placed in the acid storage cabinet to await disposal.

6.8 All of the containers that have been in contact with HF should be thoroughly rinsed in the HF rinse bath and the container to be refilled with solution placed back in the HF bath and the cover closed.

6.9 After rinsing your gloves the entire acid bench should be washed down and water should be allowed to flow into the HF rinse bath for at least 3 minutes. Litmus paper is on top of the bench to check the pH of any droplets on the bench.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'.*

STANDARD OPERATING PROCEDURE

Organisation:

TU Dublin - Tallaght

Faculty:

SCHOOL OF ENGINEERING

Procedure Name:	**HF Silicon Wafer cleaning**
Procedure No:	**E2084**
Revision:	**A**
Prepared By:	**Paul Tierney**
Date:	**04/10/10**
Approved By:	**James Wright**
Date:	**14/10/10**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A		4/10/10	4/10/10 PT	14/10/10 JW	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that the dipping of silicon wafers for cleaning and etching purposes in Hydrofluoric Acid (3.5% solution) in the microelectronics laboratory is done so in a safe manner

2.0 PURPOSE

The purpose of this procedure is to outline to staff a method of (a) understanding the risks and precautions required when dealing with Hydrofluoric Acid (HF), (b) safely dipping acids in the solution and (c) ensuring the acid bench is left in a safe condition afterwards

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

MSDS – Material Safety Data Sheets specific to a particular chemical informing the reader of general precautions, information on storage, disposal, environmental effects and emergency procedures in the event of exposure etc. where applicable to that chemical.

PPE – Personal Protective Equipment - such as gloves, glasses etc.

5.0 RESPONSIBILITY

It is the responsibility of Head of the School of Engineering and the Head of the Department of Electronic Engineering to ensure compliance to this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 This procedure should be carried out only by staff members. It is recommended a second person is present.

6.2 Ensure you have read the MSDS sheet and understand the precautions necessary with this dangerous chemical.

6.3 Ensure HF antidote gel is located on top of the acid bench. Ensure the emergency shower and eyewash station in the laboratory are functioning.

6.4 Appropriate PPE is located in the chase area behind the acid bench. This must be worn by anyone in the vicinity of the acid. This consists of the regular Laboratory PPE, though two pairs of latex gloves should be worn, along with an apron, face visor and elbow length rubber gauntlets. The condition of all gloves should be checked thoroughly.

6.5 The cover over the HF bath area in the acid bench should be opened and the wafer clasped by a thongs with fingers well back from the wafer. The wafer can be immersed in the solution.

6.6 After the desired time the wafer should be removed and thoroughly rinsed in the HF rinse bath along with the thongs.

6.7 When the wafer has been placed in a tray the cover over the HF bath should be closed. After rinsing your gloves as a precaution the entire acid bench should be washed down and water should be allowed to flow into the HF rinse bath for at least 3 minutes. Litmus paper is on top of the bench to check the pH of any droplets on the bench

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

Appendices

Refer to the Nifast General Risk Assessments Manual which is retained in the press in the gowning area to see the risk assessments for Wafer Cleaning in Hydrogen Fluoride Solutions.

TALLAGHT INSTITUTE OF TECHNOLOGY

MICRO-ELECTRONICS LABORATORY

GENERAL RISK ASSESSMENTS
&
CHEMICAL AGENTS RISK ASSESSMENTS

2003

Prepared by: Donough O' Keeffe, BSc, Dip OH

This report is intended to assist in reducing the possibility of accidents and ill health by bringing identified hazards to the attention of ITT. Within the constraints of time and resources every effort has been made to identify hazards and recommend appropriate controls. It is not implied that all other hazards are under control at the time of inspections. The report is advisory and the final decisions must be made by ITT management.

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PART I

GENERAL RISK ASSESSMENTS

1.0 INTRODUCTION

General risk assessments for activities undertaken in the microelectronics laboratory at Tallaght Institute of Technology were conducted on the 5th of June 2003. These risk assessments were undertaken at the request of Mr. TJ Ennis. Subsequent to this date a further visit was conducted in November 2003.

Section 12 (3) of the Safety, Health and Welfare at Work Act 1989 refers to the need for risk assessment, stating that a company's Safety Statement shall be based on an identification of the hazards and an assessment of the risks to safety and health at the place of work to which the safety statement relates.

The requirement to conduct risk assessments is amplified by General Provisions Regulations 1993 (Part II of the Safety, Health and Welfare at Work (General Application) Regulations 1993). Regulation 10 places a duty on the employer to be in possession of a written assessment of the risks to safety and health at the place of work.

2.0 RISK ASSESSMENT METHODOLOGY

The risk assessment process used involved the:

- Identification of significant hazards present in the workplace
- Identification of groups of people are most affected by those hazards e.g. employees, contractors and visitors.
- Recording the likelihood and severity of injury/illness associated with the hazard. Calculating the risk rating based on likelihood and severity (the risk rating is arrived at by multiplying the likelihood of injury x severity of injury - see below for details).
- Listing the current controls in place, along with responsible members of staff.
- Recommendation of additional controls in order to ensure that risks are reduced to the lowest level reasonably practicable.

Risk assessments should generally be reviewed annually and any necessary amendments made. They should also be reviewed if there is a change in circumstances e.g. new equipment, processes, procedures etc., following an accident or incident and in the event of new legislation, codes of practice or guidance being published.

RISK ASSESSMENT TOOL - PRIORITY TABLE

Likelihood	Severity: slightly harmful	harmful	very harmful
unlikely	1	2	3
likely	2	4	6
very likely	3	6	9

Slightly Harmful	Harmful	Very Harmful
► superficial injuries	► lacerations	► amputation
► minor cuts & bruises	► burns	► major fractures
► eye irritation from dust	► concussion	► poisoning
► nuisance & irritation	► serious sprains	► fatal injuries
► temporary discomfort	► minor fractures	► occupational cancer
	► dermatitis	► severely life shortening disease
	► asthma	► deafness
	► minor disability	► fatal disease
		► head injuries
		► eye injuries

RISK ASSESSMENT TOOL EXAMPLE

Likelihood	=	Unlikely	=	**1**
Severity	=	Very harmful	=	**3**
Risk Rating	=	**1 x 3**	=	**3**

ASSESSMENT	Priority	ACTION
Trivial Risk 1	Non-urgent	No action needed
Acceptable Risk 2	Non-urgent	No additional controls Monitoring required Assessment recorded
Moderate Risk 3-4	Action needed	Controls required as soon as practical Assessment recorded Controls documented
Substantial Risk 6	Urgent action needed	Controls required immediately Assessment recorded Controls documented
Intolerable Risk 9	Urgent action needed	Work prohibited/ceased Controls required immediately Assessment recorded Controls documented Work stoppage documented

3.0 RISK ASSESSMENTS

Assessment 1: Use of Furnace	**Date of Assessment: 5th June 2002** **Assessor: Donough O' Keefe B.Sc. Dip. OH** **Assessment Review Date:**
Task Description: Wafers are put in a wafer boat. The boat is placed in the horizontal tube furnaces furnace which is heated to 900°C – 1,150°C. Following a period of time the boat is withdrawn and placed to one side for cooling. Currently boron doping is the only type conducted (making P type) using boron disc dopant (a ceramic source) with nitrogen/oxygen flowing through the tubes.	

Hazard		Existing Controls	Current Risk		
			L	S	RR
High Temperatures	Users	• Sole opening to laboratory via hatch giving access to the three quartz tubes. • Process conducted in enclosed metal furnace preventing contact with high temperature components. • Fan cooling and high intensity extract in Furnace room in addition to water cooling using heat exchanger, maintain temperature of outer casing at approximately 5 degC above ambient. • Insertion -- Quartz Wafer Boat at room temperature is inserted into tube using a quartz rod. • Removal – Hot Quartz Wafer boat is withdrawn to tube entrance using the quartz rod and is pulled onto a wafer boat platform which may then be moved (on rails) away from furnace entrance. The hatch is then closed. • Wafers and quartz boat are left to cool on the wafer boat platform • Heat resistant gloves and tweezers are used to handle hot wafers/boats. • Furnace cooling from 1100degC to 500 deg C typically in approximately 20 minutes. • Temperature sensor in Furnace room – When room temperature sensor detects temperature above 35 degrees C it removes electrical supply to furnace. • Only post graduate students and staff are permitted to handle the furnace tubes.	**1**	**3**	**3**

Fire	Users	• Furnace contained within separate room constructed with layered walls for slow burning as per fire certificate requirements. • Fire Sensor in Furnace room – A rate of rise sensor is fitted in furnace room ceiling which detects fast temperature change and removes electrical supply to furnace. • Rated fire door fitted to furnace room.	**1**	**3**	**3**
Infra Red	Users	• Processes conducted in an enclosed furnace. • Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.	**1**	**2**	**2**
Electricity	Users	• Electrical components are all enclosed within furnace housing. • Electrical supply is three phase, 50Hz, 415 volt, 20KVA. • Emergency isolator is located in Furnace room. • Each furnace tube has it's own local emergency isolator. • Access to furnace room is limited to staff and user configuring furnace • In the event of electrical problems staff must be notified	**1**	**3**	**3**
Dopant Escape	Users	• Chemical Agent Risk Assessment Prepared • Extraction duct is provided on Furnace and is taken to the extraction system. • Furnace room is continuously ventilated to atmosphere • The furnaces are interlocked to prevent dopant from flowing down the tube when the door is not closed.	**1**	**3**	**2**

ACTION PLAN

Hazard	Recommended Controls	Date Action Completed	Revised Risk		
			L	S	R R
Hot Surfaces	• Provide those involved in furnace use with suitable information, instruction and training. • Label the wafer platform jig as a cooling position for the wafers, label to identify it as a hot surface. • Notice over furnace hatch warning of high temperatures				
Electricity	• Notify the staff immediately of electrical problems…Signage needed.				

Assessment 2: VDU Work	**Date of Assessment: 5th June 2002** **Assessor: Donough O' Keefe B.Sc. Dip. OH** **Assessment Review Date:**
Two VDU workstations are located in the laboratory. These are used by students for data analysis and reporting.	

Hazard	People at Risk	Existing Controls	Current Risk		
			L	S	RR
Muscukoskeletal Disease Repetitive strain disorders Carpal Tunnel Syndrome	Students	• Equipment meeting the minimum requirements has been supplied. • Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.	1.5	3	4.5

ACTION PLAN

Hazard	Recommended Controls	Date Action Completed	Revised Risk		
			L	S	RR
Muscukoskeletal Disease Repetitive strain disorders Carpal Tunnel Syndrome	• Provide information to users concerning the hazards associated with VDU work and indicating the principles of good workstation layout and good working posture.				

ASSESSMENT 3: FIRE	**Date of Assessment: 5th June 2002** **Assessor: Donough O' Keefe B.Sc. Dip. OH** **Assessment Review Date:**
Comment: Flammable substances are stored within this area (solvents) and ignition sources exist in the form of hot surfaces (e.g. the furnace and hot plates at the solvent bench).	

Hazard	People at Risk	Existing Controls	Current Risk		
			L	S	RR
Fire	Staff & students	• Laboratory subject to Institutes fire safety programme • Solvents are adequately stored within the area • Three different lab safety training courses are available for students, equipment users and lecturers/supervisors. • Ignition sources such as the furnace are adequately controlled using suitable engineering controls.	0.5	3	1.5

ASSESSMENT 4: Operating Quintel Q4000 Series IR Aligner Photolithography Unit	**Date of Assessment: 5th June 2002**
Used for patterning wafers spun with Photoresist. The Quintel uses broadband ultraviolet light (UV) to expose photoresist.	**Assessor: Donough O' Keefe B.Sc. Dip. OH** **Assessment Review Date:**

Hazard	People at Risk	Existing Controls	Current Risk		
			L	S	RR
Ultra Violet	Users	• The UV light source is enclosed within the machine and located at a height so the user is not exposed to UV. • Only staff and students that have been training to used this equipment safely my use it unsupervised. • Gloves are used to keep finger print oils off of surfaces.	0.5	3	1.5
Electricity	Users	• The power supply and internal parts are covered. • A notice advising users not to look directly at the UV light directly of look at reflected UV light is posted above this piece of equipment. • Users are warned not to use the UV light source if it is not covered. • Users are warned not to tamper with the mercury arc lamp or its power supply as the lamp operates on a high voltage dc supply which could be lethal. • Only those competent to maintain this instrument may do so because connecting the instruments cables incorrectly may result in explosion of the bulb. Refer to the instruction manual for guidance.	0.5	3	1.5

ASSESSMENT 5: Operating the UV 320 Exposure Unit	**Date of Assessment: 5th June 2002** **Assessor: Donough O' Keefe B.Sc. Dip. OH** **Assessment Review Date:**
Photolithography is the procedure whereby patterns are transferred onto wafers. A mercury arc lamp is used as a source of ultra violet radiation during exposure.	

Hazard	People at Risk	Existing Controls	Current Risk		
			L	S	RR
Ultra Violet Light	Users	• The UV light source is enclosed within the machine so the user is not exposed to UV. • Only staff and students who have been trained to use this instrument may use it unsupervised. • Gloves are used to keep finger print oils off of surfaces. • A notice advising users not to look directly at the UV light directly at any stray or reflected UV light is posted above this piece of equipment. • Users are warned not to use the UV light source if it is not covered. • The instrument is stored about 18 inches from ground level so that the UV although covered is not at eye level.	0.5	3	1.5
Electricity	Users	• The power supply and internal parts are covered. • Only technician who are competent to maintain this machine may do so as to connect the instruments cables incorrectly may result in explosion of the bulb. Refer to the instruction manual for guidance.	0.5	3	1.5

ASSESSMENT 6: Operation of Sputter Deposition Coater	Date of Assessment: 5th June 2002 Assessor: Donough O' Keefe B.Sc. Dip. OH Assessment Review Date:
This instrument includes an evacuated chamber with a radiofrequency supply and DC supply (500 volts/3 amps). Argon and nitrogen gas may be used during the operation of this device. The machine is loaded at atmospheric pressure and the sputter deposition takes place under vacuum.	

To operate, wafers are placed in the chamber and the chamber is placed under vacuum and a radio frequency charge applied (to coat the wafers with metal). The system is controlled using an Edwards Auto 306 Magnetron Spluttering System control panel.

Hazard	People at Risk	Existing Controls	Current Risk		
			L	S	RR
RF Shock and DC shock	Staff & students	• Three different lab safety training courses are available for students, equipment users and lecturers/supervisors. • The RF chamber is earthed and insulated. • Chamber is shielded to eliminate RF radiation exposure. • It is not possible to open the vacuum chamber during sputtering operations • All doors are interlocked to prevent RF exposure • Electrical panels are interlocked to prevent RF exposure. • The vacuum chamber incorporates a vacuum interlock switch. When the chamber is not under vacuum, the electrical supplies are isolated from any accessories (including RF) in the chamber and the accessories cannot be operated. • The front door of the control cabinet has an integral electrical isolation switch and a lockable catch to prevent unauthorised access to the cabinet. The rear and top panels of the control cabinet incorporate safety switches. When the door or the panels are opened the electrical supply is automatically isolated from the control cabinet.	0.5	3	1.5
Hot Surfaces	Staff & students	• Present inside chamber, however, the chamber cannot be opened when these surfaces are hot.	0.5	2	1

High and Low Pressures	Staff & students	• The vacuum chamber incorporates a vacuum interlock switch. When the chamber is not under vacuum, the electrical supplies are isolated from any accessories (including RF) in the chamber and the accessories cannot be operated • The chamber is allowed to vent from vacuum to atmosphere using argon gas. The pressure is set to 1.5 bar at the regulator • The vacuum control chamber is interlocked. • When the chamber is under vacuum the door cannot be opened. • An interlock system prevents the device from being operated in unsafe conditions (operation is disabled unless all Auto 306 doors and covers are closed. The machine can produce pressure from atmospheric pressure a chamber pressure of 7 x 10^{-7} mbar). • The chamber is designed to operate under pressure.	0.5	3	1.5
Gases (argon & nitrogen)	Staff & students	• See chemical agents risk assessment.	-	-	-
Ergonomics	Staff & students	• Task is conducted with a low frequency with low weight components.	0.5	2	1

ACTION PLAN

Hazard	Recommended Controls	Date Action Completed	Revised Risk		
			L	S	R R
Electricity	• Re-locate the gas control valve to outside the interlocked chamber in which it is currently situated to prevent users disabling the interlock to get to the valve.				

ASSESSMENT 7: Electrical Characterisation	**Date of Assessment: 5th June 2002** **Assessor: Donough O' Keefe B.Sc. Dip. OH** **Assessment Review Date:**
Task Description: Electrical characterisation is conducted at the Leica Microscope Workstation. Testing probes carrying extremely low voltages are applied to the devices on the wafers.	

Hazard	People at Risk	Existing Controls	Current Risk		
			L	S	RR
Electric Shock	Staff & students	• Voltage passing through the probes is at such a low level as to be not noticeable (3 volts and 5 volts and nano-amps of current). • Only staff and students who have been taught to use the instrument safely may use it. • A safety metal box with a door on it is placed over the probe station so that the probes are not exposed when they are tested. • A notice is place over the instrument to warn users of potential electrical shock and the danger using very sharp probes. Users must put a cover over the instrument when electrically testing devices. • Should higher voltages be required for experimental work permission is to be sought from the laboratory supervisor.	0.5	3	1.5

ASSESSMENT 8: Using Hot Plates	**Date of Assessment: 5th June 2002**
Task Description: A hot plate is used in the laboratory for heating photoresist (@ 60°C) and for solvent cleaning (@ 40°C). The hot plate is located on the solvent bench. It is also used for cleaning and baking wafers.	**Assessor: Donough O' Keefe B.Sc. Dip. OH** **Assessment Review Date:**

Hazard	People at Risk	Existing Controls	Current Risk		
			L	S	RR
Burns	Staff & students	• A list of rules for using the solvent bench are posted over the solvent bench. • Every student and staff member using the bench must be taken through these rules before they may use this bench. • The fume hood must be switched on at all times in the laboratory. • Small 100- 200 cm^3 bottles of solvent required for the experiment can be kept in the solvent bench for the duration of the experiment. • A notice stating that the hot plate may be hot and care must be taken to avoid touching them is posted above the solvent bench.	0.5	3	1.5
Fire	Staff & students	• Bottles of solvents are not to be stored in the fume hood. They are to be stored in the solvent storage cabinet. • Always use a water bath to transfer heat to flammable solvents when using a hot plate. • The waste disposal containers for solid solvent waste must not be allowed build up in the solvent bench leading to a fire hazard. This must be removed at the end of each week or sooner if they are full. • All solvent waste must be placed in the organic waste bottles in the solvent storage cabinet.	0.5	3	1.5

ACTION PLAN

Hazard	Recommended Controls	Date Action Completed	Revised Risk		
			L	S	RR
Burns **Fire**					

ACTIVITY 9: Spinner Operation	Date of Assessment: 5th June 2002
Task Description: A Spinner was located inside the fume cupboard and was used for the application of photoresist. This machine operates at speeds up to 5,000 rpm.	**Assessor: Donough O' Keefe B.Sc. Dip. OH** **Assessment Review Date:**

Hazard	People at Risk	Existing Controls	Current Risk		
			L	S	RR
High Velocity Escape of broken wafers	Staff & students	• The spinner is enclosed to prevent broken wafers from spinning off at high velocity. • The lid of the Spinner is interlocked so that the device cannot be operated open. • The spinner is located inside a fume hood. • The fume cupboard splash guard is kept down while the spinner is in operation. • A list of rules for using the spinner are posted above the solvent bench. • All staff and students must have undergone training on these rules before they may be the spinner. • When cleaning the spinner two pairs of gloves must be worn so as to avoid solvent coming into contact with skin through a tare in gloves.	0.5	3	1.5
Cuts/Sharps		When operators drop photoresist into the spinner they must keep the container at least 2cm from the top of the device to prevent breakages.	0.5	2	1

ACTION PLAN

Hazard	Recommended Controls	Date Action Completed	Revised Risk		
			L	S	RR

PART II

CHEMICAL AGENTS RISK ASSESSMENTS

1.0 INTRODUCTION

This Chemical Agents Risk Assessment was conducted on the 5th June 2003 in the microelectronics laboratory at Tallaght Institute of Technology. The assessment was conducted by Donough O' Keeffe (BSc, Dip OH) at the request of Mr TJ Ennis.

The aim of this assessment was to assess the risks to health and safety associated with exposure to chemical agents associated with tasks undertaken in laboratory as required by Regulation 4 of the Safety, health and Welfare at Work (Chemical Agents) Regulations 2001 (SI No. 619 of 2001).

The objectives were to:

- Observe the tasks undertaken in the area;
- Identify the chemical hazards associated with the tasks undertaken;
- Assess the risk to health, safety and welfare associated with these chemical hazards.

2.0 RISK ASSESSMENT METHODOLOGY

Risk assessments for the tasks observed in the area are detailed in this section. An explanation of the system employed in the determination of the hazard rating for each assessment is given in Appendix I.

4.0 RISK ASSESSMENTS

<table>
<tr><td>Task 1</td><td colspan="4">FURNACE OPERATION – EXPOSURE TO BORON OXIDES</td></tr>
<tr><td></td><td colspan="4">Boron discs are placed between the wafers. The discs heat up and boron diffuses into the wafers. Due to impurities in the wafers Boron Oxide may be produced during furnace operation. Very small quantities are expected.</td></tr>
<tr><td>Chemical</td><td colspan="2" rowspan="2">Boron Oxide</td><td>R-phrases</td><td>R36, R 37, R38</td></tr>
<tr><td>OEL</td><td>10 mg/m^3 (8 hr TW)
20 (15 min STEL)</td></tr>
<tr><td>Current controls</td><td colspan="4">• Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.
• Extraction duct is provided on Furnace and is taken to the extraction system.
• Furnace room is continuously ventilated to atmosphere.
• The furnaces are interlocked to prevent dopant from flowing down the tube when the door is not closed.</td></tr>
<tr><td>Hazard</td><td colspan="4">Boron oxide may produce irritation of the nasal mucous membranes and the respiratory tract. Mild irritation to the skin, eye, and mucous membranes. Prolonged skin contact may result in redness and irritation.</td></tr>
<tr><td>Current Hazard Rating</td><td>Hazard Group</td><td>C</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>Amount Used</td><td>Small</td></tr>
<tr><td>Volatility/Dustiness</td><td>High</td><td>→</td><td>Severity</td><td>2</td></tr>
<tr><td colspan="3" rowspan="5"></td><td>Frequency</td><td>1.5</td></tr>
<tr><td>Probability</td><td>1</td></tr>
<tr><td>Number Exposed</td><td>2</td></tr>
<tr><td>Current Hazard Rating</td><td>6</td></tr>
<tr><td colspan="2">Low Risk</td></tr>
</table>

<table>
<tr><td>Task 2</td><td colspan="6">WAFER CLEANING IN NITRIC ACID</td></tr>
<tr><td></td><td colspan="6">Wafers are cleaned with nitric acid before the semiconductor manufacturing process commences.</td></tr>
<tr><td>Chemical</td><td colspan="3" rowspan="2">Nitric Acid</td><td>R-phrases</td><td colspan="2">R35, R 8</td></tr>
<tr><td>OEL</td><td colspan="2">5 mg/m^3 (8 hr TW)
10 (15 min STEL)</td></tr>
<tr><td>Current controls</td><td colspan="6">• Both a safety shower and eyewash are present in the area.
• Users use all appropriate PPE as defined in the safety rules for working at the acid bench.
• No Food or Drink is permitted in the lab.
• Material safety data sheets (MSDSs) are available in the tech room and from the nurse.
• All students must have MSDSs for chemicals used before commencing experiments.
• Cleaning is conducted in a laminar flow exhausted wet sink (a fume cupboard).
• Splash guards are in place on the fume cupboard.
• Staff and students must undergo training on the use of wafer cleaning chemicals before carrying out this procedure.
• When cleaning in nitric acid the wafers are held in a wafer carrier and placed into nitric acid in a 2000ml beaker. The beaker is kept in a etching bath in the acid bench to avoid it being turned over/spilled.
• The wafer carrier is removed from the beaker while the beaker is in the bath and placed in the deionised water for cleaning.
• The wafers and wafer carrier is then sprayed with deionised water before being removed from the acid bench in a bowl to avoid splashing water on the floor.
• The nitric acid is placed in the container labelled nitric acid cleaning solution and stored in the acid storage cabinet.
• The rules for using the acid bench is place over the acid bench.
• Eye and skin protection must be worn while handling nitric acid in compliance with the rules for using the acid bench.</td></tr>
<tr><td>Hazard</td><td colspan="6">Contact with skin eyes or respiratory tract will cause severe burns. Concentrated nitric acid is an oxidising agent and care must be taken when handling it.</td></tr>
<tr><td>Current Hazard Rating</td><td>Hazard Group</td><td>C</td><td rowspan="4">→</td><td>Severity</td><td>3</td></tr>
<tr><td>Amount Used</td><td>S</td><td>Frequency</td><td>2.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>M</td><td>Probability</td><td>1</td></tr>
<tr><td colspan="3"></td><td>Number Exposed</td><td>2</td></tr>
<tr><td colspan="3"></td><td>Current Hazard Rating</td><td>14</td></tr>
<tr><td colspan="3"></td><td colspan="2">Low Risk</td></tr>
</table>

<table>
<tr><td>Task 3</td><td colspan="4">EQUIPMENT CLEANING 2-PROPANOL</td></tr>
<tr><td></td><td colspan="4">Beakers, spinner, wafer holders, wafers, Petri dishes are cleaned in 2-propanol after washing in deionised water.</td></tr>
<tr><td rowspan="4">Chemical</td><td rowspan="2">2 propanol</td><td>R-phrases</td><td colspan="2">R36, R 11, R66, R67</td></tr>
<tr><td>OEL</td><td colspan="2">TWA:980 mg/m^3
STEL: 1225 mg/m^3</td></tr>
<tr><td rowspan="2">Acetone</td><td>R-phrases</td><td colspan="2">R11, R36, R67</td></tr>
<tr><td>OEL</td><td colspan="2">TWA: 1210 mg/m^3
STEL: -</td></tr>
<tr><td>Current controls</td><td colspan="4">• Both a safety shower and eyewash are present in the area.
• No Food or Drink is permitted in the lab.
• Material safety data sheets (MSDSs) are available in the tech room and from the nurse.
• All students must have MSDSs for chemicals used before commencing experiments.
• Cleaning is conducted in a laminar flow exhausted wet sink (a fume cupboard).
• Splash guards are in place on the fume cupboard.
• Staff and students must undergo training on the use of solvent bench.
• Safety glasses and suitable gloves must be worn in the laboratory.
• Only small amounts of the solvent (less than 200 ml) can be kept on the bench while working at the solvent bench to avoid the risk of fire because a hot plate is kept at this bench also.
• Acetone and 2-propanol must be disposed of in the solvent waste bottle kept in the solvent storage cabinet.
• Wipes contaminated with these chemicals after cleaning the bench or equipment must be disposed of in the solid waste container on the solvent bench.
• If your glove has been splashed with either of these chemicals remove it and place it in the solid waste container.</td></tr>
<tr><td>Hazard</td><td colspan="4">2-Propanol: Skin permeable. Highly flammable, an irritant and contact with eyes may cause serious damage. The vapours may cause dizziness and drowsiness and over exposure may cause damage to the nervous system and liver.
Acetone: Highly flammable, irritating to eyes & skin. Repeated skin exposure may cause dryness and cracking. Vapours may cause drowsiness & dizziness, overexposure may cause liver or kidney damage.</td></tr>
<tr><td>Current Hazard Rating</td><td colspan="4">
<table>
<tr><td>Hazard Group</td><td>C</td><td rowspan="3">→</td><td>Severity</td><td>3</td></tr>
<tr><td>Amount Used</td><td>S</td><td>Frequency</td><td>2.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>M</td><td>Probability</td><td>1</td></tr>
<tr><td colspan="3"></td><td>Number Exposed</td><td>2</td></tr>
<tr><td colspan="3"></td><td>Current Hazard Rating</td><td>14</td></tr>
<tr><td colspan="3"></td><td colspan="2">Low Risk</td></tr>
</table>
</td></tr>
</table>

TASK 4	**NEUTRALISING ACIDS**			
	Acids that can be disposed of down the drain must first be neutralised with NaOH. The acids will constitute an additional risk for which the user is referred to the risk assessment for handling that particular material.			
Chemical	Sodium Hydroxide NaOH	R-phrases	R35,	
		OEL	TWA: - STEL: 2 mg/m^3	
Current controls	• Both a safety shower and eyewash are present in the area. • All relevant PPE as defined in the safety rules for working at the acid bench must be worn when conducting this task. • No Food or Drink is permitted in the lab. • Material safety data sheets (MSDSs) are available in the tech room and from the nurse. • All students must have MSDSs for chemicals used before commencing experiments. • Sodium hydroxide is in the form of pellets • The acid is diluted in a deionised water bath by adding acid to the water. The pH of the acid is taken using litmus paper. NaOH pellets are added until the pH of the solution is neutral. • Gloves safety visors and aprons are worn at the acid bench where this procedure is performed. • The air flow at the acid bench is switched on at all times.			
Hazard	Sodium Hydroxide (Caustic): Causes severe burns on contact with the skin eyes and respiratory tract. It is also highly reactive and care must be taken in its handling.			
Current Hazard Rating	Hazard Group	C		
	Amount Used	S		
	Volatility/Dustiness	M	→	

Severity	3
Frequency	2.5
Probability	1
Number Exposed	1
Current Hazard Rating	**7.5**
Low Risk	

<table>
<tr><td>Task 5</td><td colspan="4">DEVELOPING THE EXPOSED PHOTORESIST</td></tr>
<tr><td></td><td colspan="4">A Sodium Hydroxide solution is used in the developing of the exposed photoresist.</td></tr>
<tr><td>Chemical</td><td colspan="2" rowspan="2">NaOH solution</td><td>R-phrases</td><td>R35</td></tr>
<tr><td>OEL</td><td>STEL: 2 mg/m^3</td></tr>
<tr><td>Current controls</td><td colspan="4">• All relevant PPE as recommended when working with corrosives in the laboratory must be used when conducting this task.
• Both a safety shower and eyewash are present in the area.
• No Food or Drink is permitted in the lab.
• Material safety data sheets (MSDSs) are available in the tech room and from the nurse.
• All students must have MSDSs for chemicals used before commencing experiments.
• Developing is conducted in a laminar flow exhausted wet sink (a fume cupboard) At the solvent bench.
• Splash guards are in place on the fume cupboard.
• Staff and students must undergo training on the use of the developing procedure before carrying out this procedure.
• After the photoresist on the wafer has been exposed to UV light it is developed in a 20% sodium hydroxide solution. The sodium hydroxide solution is placed in a 2000 ml beaker in the fume hood. The wafer is place in the wafer holder and the wafer hold placed in the beaker. The solution is stirred using the wafer holder for the duration of the developing time.
• Gloves and safety glasses must be worn for this procedure.</td></tr>
<tr><td>Hazard</td><td colspan="4">Sodium Hydroxide (Caustic): Causes severe burns on contact with the skin eyes and respiratory tract. It is also highly reactive and care must be taken in its handling.</td></tr>
<tr><td>Current Hazard Rating</td><td colspan="4"><table>
<tr><td>Hazard Group</td><td>C</td><td rowspan="3">→</td><td>Severity</td><td>3</td></tr>
<tr><td>Amount Used</td><td>S</td><td>Frequency</td><td>2.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>M</td><td>Probability</td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>Number Exposed</td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>Current Hazard Rating</td><td>7.5</td></tr>
<tr><td></td><td></td><td></td><td colspan="2">Low Risk</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Task 6</td><td colspan="4">WAFER CLEANING
Wafers are cleaned with photoresist stripper before the semiconductor manufacturing process commences.</td></tr>
<tr><td rowspan="3">Chemical</td><td>Photoresist stripper</td><td colspan="2">R-phrases</td><td>R37/38, R41, R43</td></tr>
<tr><td>(2-methoxymethylethoxy)propanol</td><td colspan="2">OEL</td><td>TWA: 308 mg/m^3</td></tr>
<tr><td rowspan="2">Nitric Acid</td><td colspan="2">R-phrases</td><td>R35, R 8</td></tr>
<tr><td>OEL</td><td>5 mg/m^3 (8 hr TW)
10 (15 min STEL)</td></tr>
<tr><td>Current controls</td><td colspan="4">• Both a safety shower and eyewash are present in the area.
• No Food or Drink is permitted in the lab.
• Material safety data sheets (MSDSs) are available in the tech room and from the nurse.
• All students must have MSDSs for chemicals used before commencing experiments.
• Cleaning is conducted in a laminar flow exhausted wet sink (a fume cupboard).
• Splash guards are in place on the fume cupboard.
• Staff and students must undergo training on the use of wafer cleaning chemicals before carrying out this procedure.
• When cleaning in photoresist stripper the wafers are held in a wafer carrier and placed into nitric acid in a 2000ml beaker. The beaker is kept in a temperature controlled water bath. The larger 2000ml beaker is used because it cannot over turn in the water bath.
• The wafer carrier is removed from the beaker while the beaker is in the bath and placed in the deionised water for cleaning.
• The wafers and wafer carrier is then sprayed with deionised water before being removed from the acid bench in a bowl to avoid splashing water on the floor.
• The photoresist stripper is placed in the container labelled used photoresist stripper and stored in the acid storage cabinet.
• The rules (including appropriate PPE, gloves, eye protection and apron) for using the acid bench is place over the acid bench.</td></tr>
<tr><td>Hazard</td><td colspan="4">Photoresist Stripper: This substance is classified as an irritant, it is irritating to the respiratory system and skin and may cause serious damage to the eyes. Its contains skin permeable substances. It may also cause sensitisation through skin contact.
Nitric Acid: Contact with skin eyes or respiratory tract will cause severe burns. Concentrated nitric acid is an oxidising agent and care must be taken when handling it. It is classified as causing severe burns.</td></tr>
<tr><td>Current Hazard Rating</td><td colspan="4"><table>
<tr><td>Hazard Group</td><td>E</td><td rowspan="3">→</td><td>Severity</td><td>4</td></tr>
<tr><td>Amount Used</td><td>S</td><td>Frequency</td><td>1.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>L</td><td>Probability</td><td>1</td></tr>
<tr><td colspan="3"></td><td>Number Exposed</td><td>1</td></tr>
<tr><td colspan="3"></td><td>Current Hazard Rating</td><td>10</td></tr>
<tr><td colspan="3"></td><td colspan="2">Low Risk</td></tr>
</table></td></tr>
</table>

Task 7	**WAFER CLEANING IN HF SOLUTIONS**		
	Wafers are cleaned with hydrofluoric acid		
Chemical	35% HF diluted down to 3.5% for etching	R-phrases	R26, R 27, R28, R35
		OEL	TWA: 1.5 mg/m^3 STEL: 0.8 mg/m^3
Current controls	• Both a safety shower and eyewash are present in the area. • No Food or Drink is permitted in the lab. • Material safety data sheets (MSDSs) are available in the tech room and from the nurse. • All students must have MSDSs for chemicals used before commencing experiments. • Cleaning is conducted in a laminar flow exhausted wet sink (a fume cupboard). • Splash guards are in place on the fume cupboard. • Staff and students must undergo training on the use of wafer cleaning chemicals before carrying out this procedure. • Hydroflouric acid solution (3.5%) is placed in a teflon beaker 110mm diameter. This beaker is held in the HF etching bath. A second beaker is placed in the HF etching bath to prevent the Teflon beaker holding the HF solution being overturned. This bath is dedicated to holding the HF solution and the Teflon beaker must not be removed unless the HF solution is being changed. The lid on the etching bath covers the beaker must be close when HF eching is not occurring and the solution is stored in this bath. • The air must be switched on at all times. • When a wafer is to be stripped of its oxide it is dipped into the Teflon beaker using a tweezers. • If the wafer is dropped off the end of the tweezers into the HF solution. This must be reported to either Andrew Pender, James Wright or T.J. Ennis who will look after changing the solution. • person must resent in the laboratory when work with HF is undertaken. • HF antidote gel is placed above the acid bench. • Rules for handling HF splashes are placed above the acid bench. • The diameter of the beaker is such that it allows the wafer be dipped in but narrow enough so that if the wafer is dropped in it will remain standing upright and may be retrieved. • The deionised water bath is in front of the HF bath and is used to rinse the wafer when it is taken out of the HF solution. • The wafer is then sprayed with deionised water. • The wafer is then placed into a wafer holder which is placed in a bowl to be carried to the spinner and spin dried. • The HF etching bath is at the back of the acid bench so as to keep it away from other work that may be carried out at this bench. • HF resistant gloves that reach to the elbow must be worn when working with HF to protect from any HF vapours that might come from this bench and a suitable apron and visor. • When work with the HF solution is finished the acid bench is sprayed with deionised water and litmus paper used to check the pH for water droplets on the bench.		

	• The acid resistant gloves are sprayed with deionised water for 5 minutes and removed and placed under the HF sensor on the acid bench. • The apron and visor are then checked for any moisture droplets and if dry are place in the area behind the acid bench. If there are droplets on either the apron or visor they are treated as HF solution and washed. • The inner gloves are then removed in the gowning area the person must then check for any moisture penetration through the gloves onto their hands. They wash their hands and arms well before returning to the laboratory. • A safety visor and an apron must be worn when working with HF solutions. • No person may work with HF alone. A second suitable competent

Hazard	HF causes severe burns when it comes in contact with the skin. It is very toxic by inhalation, if swallowed and in contact with the skin.				
Current Hazard Rating	Hazard Group	D			
	Amount Used	S			
	Volatility/Dustiness	M	→	Severity	4
				Frequency	2.5
				Probability	1
				Number Exposed	1
				Current Hazard Rating	**10**
				Low Risk	

Task 8	**WAFER ETCHING IN HF SOLUTIONS**		
	Wafers are etched in BOE (buffered oxide etch) contains HF		
Chemical	Ammonium HF buffer solution	R-phrases	R23, R 24, R25, R34
		OEL	TWA: 1.5 mg/m^3 STEL: 0.8 mg/m^3
Current controls	• Suitable gloves, visor and apron must be worn when conducting this task. • Both a safety shower and eyewash are present in the area. • No Food or Drink is permitted in the lab. • Material safety data sheets (MSDSs) are available in the tech room and from the nurse. • All students must have MSDSs for chemicals used before commencing experiments. • Cleaning is conducted in a laminar flow exhausted wet sink (a fume cupboard). • Splash guards are in place on the fume cupboard. • Staff and students must undergo training on the use of wafer cleaning chemicals before carrying out this procedure. • The BOE is placed in a teflon beaker 110mm diameter. This beaker is held in a larger polypropylene beaker (1000 ml). These beakers are placed in the BOE etching bath to prevent the Teflon beaker being overturned. This bath is dedicated to holding the HF solution and is not removed unless the HF solution is being changed. The lid on the etching bath covers these beakers and the solution is stored in this bath. • The air must be switched on at all times. • When a wafer is to be etched it is dipped into the Teflon beaker using a tweezers. • The diameter of the beaker is such that it allows the wafer be dipped in but narrow enough so that if the wafer is dropped in it will remain standing upright and may be retrieved. • If a number of wafers are to be etched the BOE is place in a wide bottom polypropylene beaker (2000 ml). The wafers are place in the wafer holder and the wafer holder placed in the BOE. • The deionised water bath is in front of the BOE bath and is used to rinse the wafers when it is taken out of the BOE solution. • The wafer is then sprayed with deionised water. • The wafer is then placed into a wafer holder which is placed in a bowl to be carried to the spinner and spin dried. • The HF etching bath is at the back of the acid bench so as to keep it away from other work that may be carried out at this bench. • HF resistant gloves that reach to the elbow must be worn when working with HF to protect from any HF vapours that might come from this bench. • When work with the HF solution is finished the acid bench is sprayed with deionised water and litmus paper used to check the pH for water droplets on the bench. • The acid resistant gloves are sprayed with deionised water for 5 minutes and removed and placed under the HF sensor on the acid bench.		

<table>
<tr><td></td><td>

The apron and visor are then checked for any moisture droplets and if dry are place in the area behind the acid bench. If there are droplets on either the apron or visor they are treated as HF solution and washed.
The inner gloves are then removed in the gowning area the person must then check for any moisture penetration through the gloves onto their hands. They wash their hands and arms well before returning to the laboratory.
A safety visor and an apron must be worn when working with HF solutions.
No person may work with HF alone. A second suitable competent person must be present in the laboratory when work with HF is being carried out undertaken.
HF antidote gel is placed above the acid bench.
Rules for handling HF splashes are placed above the acid bench.

</td></tr>
<tr><td>Hazard</td><td>Hydrofluoric Acid: HF causes severe burns when it comes in contact with the skin. It is very toxic by inhalation, if swallowed and in contact with the skin.</td></tr>
<tr><td>Current Hazard Rating</td><td>
<table>
<tr><td>Hazard Group</td><td>C</td><td rowspan="3">→</td><td>Severity</td><td>3</td></tr>
<tr><td>Amount Used</td><td>S</td><td>Frequency</td><td>1.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>M</td><td>Probability</td><td>1</td></tr>
<tr><td colspan="3" rowspan="3"></td><td>Number Exposed</td><td>2</td></tr>
<tr><td>Current Hazard Rating</td><td>9</td></tr>
<tr><td colspan="2">Low Risk</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>Task 9</td><td colspan="3">WAFER CLEANING USING RCA CLEANING</td></tr>
<tr><td></td><td colspan="3">This task involves a two stage cleaning of the wafers. The first stage uses Ammonium Hydroxide, the second Hydrochloric acid and Hydrogen Peroxide.
Clean 1.
NH4OH: H2O2: H2O (1:1:5)
Clean2 :
HCl: H2O2: H2O (1:1:6) etch</td></tr>
<tr><td rowspan="6">Chemical</td><td rowspan="2">HCL (37%)</td><td>R-phrases</td><td>R34 R37,</td></tr>
<tr><td>OEL</td><td>TWA: 7 mg/m^3
STEL: 14 mg/m^3</td></tr>
<tr><td rowspan="2">H_2O_2 (30%)</td><td>R-phrases</td><td>R34</td></tr>
<tr><td>OEL</td><td>TWA: 1.5 mg/m^3
STEL: 3.0 mg/m^3</td></tr>
<tr><td rowspan="2">NH_4OH</td><td>R-phrases</td><td>R34 R50</td></tr>
<tr><td>OEL</td><td>TWA: 25 ppm
STEL: 35 ppm</td></tr>
<tr><td>Current controls</td><td colspan="3">• Both a safety shower and eyewash are present in the area.
• For work at the acid bench the wearing of a visor, an apron and suitable gloves is mandatory.
• No Food or Drink is permitted in the lab.
• Material safety data sheets (MSDSs) are available in the tech room and from the nurse.
• All students must have MSDSs for chemicals used before commencing experiments.
• Cleaning is conducted in a laminar flow exhausted wet sink (a fume cupboard).
• Splash guards are in place on the fume cupboard.
• Staff and students must undergo training on the use of wafer cleaning chemicals before carrying out this procedure.
• The air flow must be switched on at all times.
• The two solutions are made up placed in 2000 ml beakers which are placed in etching baths number 2 and 3. The etching baths number 2 and 3 are at the back of the acid bench so as to keep it away from other work that may be carried out at this bench.
• These cleaning steps are each carried out at 75^{o}C -85^{o}C for 15 -20 minutes. The cleaning solution is heated up in the water bath when the desired temperature is set and automatically controlled.
• Care must be taken to ensure that the water level is sufficiently high to cover the thermocouple which will insure that the bath maintains the temperature correctly.
• The wafers are placed in a wafer holder and the wafer holder is then placed in the cleaning solution in the water bath.
• The wafer holder is then removed and place in deionised water.
• The wafers and holder are then sprayed with deionised water.
• Acid resistant gloves that reach to the elbow must be worn when working with these chemicals to protect from any vapours that might come from this bench.
• A safety visor and an apron must be worn when working with these chemicals.
• After working with these chemicals the acid bench is sprayed with deionised water and litmus paper used to check the pH for water droplets on the bench.</td></tr>
</table>

<table>
<tr><td></td><td>

The apron and visor are then checked for any moisture droplets and if dry are placed in the area behind the acid bench. If there are droplets on either the apron or visor they are washed.
No person may work with these chemicals alone. A second suitable competent person must resent in the laboratory when work is undertaken at the acid bench.

</td></tr>
<tr><td>Hazard</td><td>Hydrogen Peroxide: An oxidising agent, it is reactive and may give off oxygen in the presence of heat or when undergoing a reaction, hence it may contribute to an increase risk of fire if not controlled. It is corrosive and may cause burns to skin, eyes and respiratory tract.
Hydrochloric Acid: Concentrated acids cause severe burns when they come in contact with the skin and eyes or are inhaled.
Ammonium Hydroxide: Concentrated solution is extremely damaging to eyes. Even contact with dilute ammonia solution can lead to serious eye damage. Harmful if swallowed or inhaled and in contact with skin. Very destructive of mucous membranes. Corrosive - causes burns.</td></tr>
<tr><td>Current Hazard Rating</td><td>
<table>
<tr><td>Hazard Group</td><td>C</td><td rowspan="3">→</td><td>Severity</td><td>3</td></tr>
<tr><td>Amount Used</td><td>S</td><td>Frequency</td><td>2.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>M</td><td>Probability</td><td>1</td></tr>
<tr><td colspan="3" rowspan="3"></td><td>Number Exposed</td><td>2</td></tr>
<tr><td>Current Hazard Rating</td><td>9</td></tr>
<tr><td colspan="2">Low Risk</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>Task 10</td><td colspan="3">WAFER CHEMICAL OXIDATION PRIOR TO CLEANING</td></tr>
<tr><td></td><td colspan="3">A solutions of sulphuric acid and hydrogen peroxide is used to oxidise the wafer prior to cleaning (1:1 Solution of Sulphuric Acid and hydrogen peroxide)</td></tr>
<tr><td rowspan="4">Chemical</td><td rowspan="2">H_2SO_4</td><td>R-phrases</td><td>R35</td></tr>
<tr><td>OEL</td><td>TWA: 1 mg/m^3
STEL: -</td></tr>
<tr><td rowspan="2">H_2O_2 (30%)</td><td>R-phrases</td><td>R34</td></tr>
<tr><td>OEL</td><td>TWA: 1.5 mg/m^3
STEL: 3.0 mg/m^3</td></tr>
<tr><td>Current controls</td><td colspan="3">• Both a safety shower and eyewash are present in the area.
• For work at the acid bench the wearing of a visor, an apron and suitable gloves is mandatory.
• No Food or Drink is permitted in the lab.
• Material safety data sheets (MSDSs) are available in the tech room and from the nurse.
• All students must have MSDSs for chemicals used before commencing experiments.
• Oxidation is conducted in the acid bench a laminar flow exhausted wet sink (a fume cupboard).
• Splash guards are in place on the fume cupboard.
• Staff and students must undergo training on the use of acids before carrying out this procedure.
• The air flow must be switched on at all times.
• The solution is made up placed in a 2000 ml beaker which is then placed in etching bath number 3.
• The wafers are placed in a wafer holder and the wafer holder is then placed in the oxidising solution.
• The wafer holder is then removed and place in deionised water.
• The wafers and holder are then sprayed with deionised water.
• Acid resistant gloves that reach to the elbow must be worn when working with these chemicals to protect from any vapours that might come from this bench.
• A safety visor and an apron must be worn when working with these chemicals.
• After working with these chemicals the acid bench is sprayed with deionised water and litmus paper used to check the pH for water droplets on the bench.
• The apron and visor are then checked for any moisture droplets and if dry are placed in the area behind the acid bench. If there are droplets on either the apron or visor they are washed.
• No person may work with these chemicals alone. A second suitable competent person must resent in the laboratory when work is undertaken at the acid bench.</td></tr>
<tr><td>Hazard</td><td colspan="3">Hydrogen Peroxide: An oxidising agent, it is reactive and may give off oxygen in the presence of heat or when undergoing a reaction, hence it may contribute to an increase risk of fire if not controlled. It is corrosive and may cause burns to skin, eyes and respiratory tract.
Sulphuric Acid: Toxic when inhaled, causes severe burns when it come in contact with the skin, eyes or is inhaled. Target organs are the teeth and the cardio vascular system.</td></tr>
</table>

Current Hazard Rating					
	Hazard Group	C			
	Amount Used	S			
	Volatility/Dustiness	M	→	Severity	3
				Frequency	1.5
				Probability	1
				Number Exposed	1
				Current Hazard Rating	**4.5**
				Acceptable Risk	

Task 11	**ALUMINIUM ETCH**		
	A mixture of Phosphoric (80%), nitric (5%) and acetic (5%) acids in water (10%) are used at the acid bench to etch wafers.		
Chemical	Phosphoric Acid (80%)	R-phrases	R34
		OEL	TWA: 1 mg/m^3 STEL: 2 mg/m^3
	Nitric Acid (5%)	R-phrases	R8, R35
		OEL	TWA: 5 mg/m^3 STEL: 10 mg/m^3
	Acetic Acid (5%)	R-phrases	R10,R35
		OEL	TWA: 25 mg/m^3 STEL: 37 mg/m^3
Current controls	• Both a safety shower and eyewash are present in the area. • No Food or Drink is permitted in the lab. • Material safety data sheets (MSDSs) are available in the tech room and from the nurse. • All students must have MSDSs for chemicals used before commencing experiments. • Al etching is conducted in the acid bench, a laminar flow exhausted wet sink (a fume cupboard) • Splash guards are in place on the fume cupboard. • Staff and students must undergo training on the use of Al etching chemicals before carrying out this procedure. • The air flow must be switched on at all times. • The solution is made up in a 2000 ml beaker which is stored in etching bath no. 3 in the acid bench. • The etching is carried out at 45^{o}C. The etching solution is heated up in the water bath where the desired temperature is set and automatically controlled. • Care must be taken to ensure that the water level is sufficiently high to cover the thermometer which will insure that the bath maintains the temperature correctly. • The wafers are placed in a wafer holder and the wafer holder is then placed in the cleaning solution in the water bath. • The wafer holder is then removed and placed in deionised water. • The wafers and holder are then sprayed with deionised water. • Acid resistant gloves that reach to the elbow must be worn when working with these chemicals to protect from any vapours that might come from this bench. • After working with these chemicals the acid bench is sprayed with deionised water and litmus paper used to check the pH for water droplets on the bench. • A safety visor and an apron must be worn when working with these chemicals. • The apron and visor are then checked for any moisture droplets and if dry are placed in the area behind the acid bench. If there are droplets on either the apron or visor they are washed. • No person may work with these chemicals alone. A second suitable competent person must resent in the laboratory when work is undertaken at the acid bench.		

<table>
<tr><td>Hazard</td><td colspan="5">Nitric Acid: Contact with skin eyes or respiratory tract will cause severe burns. Concentrated nitric acid is an oxidising agent and care must be taken when handling it. It is classified as causing severe burns.
Phosphoric Acid: Corrosive, causes severe burns in contact with tissue (skin, eyes and respiratory tract. Targets the teeth and kidneys.
Acetic Acid: Corrosive, causes severe burns in contact with tissue (skin, eyes and respiratory tract. Targets the teeth and kidneys.</td></tr>
<tr><td rowspan="6">Current Hazard Rating</td><td>Hazard Group</td><td>C</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td></tr>
<tr><td>Amount Used</td><td>S</td></tr>
<tr><td>Volatility/Dustiness</td><td>M</td><td>→</td><td>Severity</td><td>3</td></tr>
<tr><td colspan="3" rowspan="4"></td><td>Frequency</td><td>1.5</td></tr>
<tr><td>Probability</td><td>1</td></tr>
<tr><td>Number Exposed</td><td>2</td></tr>
<tr><td>Current Hazard Rating</td><td>9</td></tr>
<tr><td colspan="3"></td><td colspan="2">Low Risk</td></tr>
</table>

<table>
<tr><td>Task 12</td><td colspan="6">FURNACE OPERATION & NITROGEN ADDITION</td></tr>
<tr><td></td><td colspan="6">During the operation of the furnace small amounts of nitrogen gas are added as an inert atmosphere.</td></tr>
<tr><td>Chemical</td><td colspan="2" rowspan="2">Nitrogen</td><td colspan="2">R-phrases</td><td colspan="2">Simple Asphxiant</td></tr>
<tr><td>OEL</td><td colspan="2">N/a</td></tr>
<tr><td>Current controls</td><td colspan="6">• Furnace ventilated to atmosphere
• Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.
• Enclosed systems for automatic delivery and dispensing of chemicals to minimise risk of exposure as well as inadvertent mixing of incompatible chemicals.
• There is an oxygen probe in the laboratory to detect oxygen deficiency.
• Three flow controllers are used to set flow to the furnace
• System maintained on a regular basis to prevent deterioration and nitrogen leaks.</td></tr>
<tr><td>Hazard</td><td colspan="6">Asphyxiating in high concentration as it displaces air and may result in an oxygen deficient atmosphere.</td></tr>
<tr><td>Current Hazard Rating</td><td>Hazard Group</td><td>A</td><td colspan="3"></td></tr>
<tr><td></td><td>Amount Used</td><td>S</td><td colspan="3"></td></tr>
<tr><td></td><td>Volatility/Dustiness</td><td>H</td><td>→</td><td>Severity</td><td>1</td></tr>
<tr><td colspan="3"></td><td>Frequency</td><td>2.5</td></tr>
<tr><td colspan="3"></td><td>Probability</td><td>1</td></tr>
<tr><td colspan="3"></td><td>Number Exposed</td><td>5</td></tr>
<tr><td colspan="3"></td><td>Current Hazard Rating</td><td></td></tr>
<tr><td colspan="3"></td><td colspan="2">Acceptable Risk</td></tr>
</table>

<table>
<tr><td>Task 13</td><td colspan="5">FURNACE ARGON ADDITION
During the operation of the furnace small amounts of argon gas are added as an inert atmosphere.</td></tr>
<tr><td>Chemical</td><td colspan="2">Argon</td><td>R-phrases</td><td colspan="2">Simple Asphxiant</td></tr>
<tr><td></td><td colspan="2"></td><td>OEL</td><td colspan="2">N/a</td></tr>
<tr><td>Current controls</td><td colspan="5">• Furnace ventilated to atmosphere
• Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.
• There is an oxygen probe in the laboratory to detect oxygen deficiency.
• There are three flow controllers in place in the furnace to control the flow of gases.
• Enclosed systems for automatic delivery and dispensing of chemicals to minimise risk of exposure as well as inadvertent mixing of incompatible chemicals.</td></tr>
<tr><td>Hazard</td><td colspan="5">Asphyxiant in high concentrations which may result in an oxygen deficient atmosphere. A non toxic, stable, non-flammable gas.</td></tr>
<tr><td>Current Hazard Rating</td><td>Hazard Group</td><td>A</td><td colspan="3"></td></tr>
<tr><td></td><td>Amount Used</td><td>S</td><td colspan="3"></td></tr>
<tr><td></td><td>Volatility/Dustiness</td><td>H</td><td>→</td><td>Severity</td><td>1</td></tr>
<tr><td></td><td colspan="2"></td><td></td><td>Frequency</td><td>2.5</td></tr>
<tr><td></td><td colspan="2"></td><td></td><td>Probability</td><td>1</td></tr>
<tr><td></td><td colspan="2"></td><td></td><td>Number Exposed</td><td>2</td></tr>
<tr><td></td><td colspan="2"></td><td></td><td>Current Hazard Rating</td><td>5</td></tr>
<tr><td></td><td colspan="2"></td><td></td><td colspan="2">Acceptable Risk</td></tr>
</table>

<table>
<tr><td>Task 14</td><td colspan="4">DISPOSAL OF IPA/ACETONE/PHOTORESIST WASTE
IPA wipes and solution are used to clean photoresist from the spinner at the solvent bench. Acetone may be used where stains are difficult to remove. Liquid organic waste is poured into an organic waste bottle and the bottle is closed and placed in the solvent storage cabinet. All materials are removed to the chemistry department for disposal.</td></tr>
<tr><td rowspan="6">Chemical</td><td rowspan="2">2-propanol</td><td>R-phrases</td><td colspan="2">R11, R36, R37</td></tr>
<tr><td>OEL</td><td colspan="2">TWA: 980mg/m^3
STEL: 1225 mg/m^3</td></tr>
<tr><td rowspan="2">2-methoxy-1-methyl-ethyl-acetate (in photoresist)</td><td>R-phrases</td><td colspan="2">R10, R36</td></tr>
<tr><td>OEL</td><td colspan="2">TWA: 275 mg/m^3
STEL: 550 mg/m^3</td></tr>
<tr><td rowspan="2">Acetone</td><td>R-phrases</td><td colspan="2">R11, R36, R67</td></tr>
<tr><td>OEL</td><td colspan="2">TWA: 1210 mg/m^3
STEL: -</td></tr>
<tr><td>Current controls</td><td colspan="4">• Basket for disposal of organic waste located within the fume hood.
• The amount of waste must not be permitted to build up in the fume hood.
• Nitrile gloves must be worn while conducting this task.
• Fume hood operational at all times.
• Ensure that the hot plate is always switched off following use to control potential ignition sources.
• No Food or Drink is permitted in the lab.
• All users of the lab must undergo training before they use the facility.</td></tr>
<tr><td>Hazard</td><td colspan="4">Photoresist: this substance is classified as being flammable and irritating to the eyes. It contains in excess of 2-methoxy-1-methyl-ethyl-acetate which is skin permeable.
2-Propanol: Skin permeable. Highly flammable, an irritant and contact with eyes may cause serious damage. The vapours may cause dizziness and drowsiness and over exposure may cause damage to the nervous system and liver.</td></tr>
<tr><td>Current Hazard Rating</td><td colspan="4"><table>
<tr><td>Hazard Group</td><td>C</td><td rowspan="3">→</td><td>Severity</td><td>2</td></tr>
<tr><td>Amount Used</td><td>S</td><td>Frequency</td><td>2.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>H</td><td>Probability</td><td>1</td></tr>
<tr><td colspan="3"></td><td>Number Exposed</td><td>2</td></tr>
<tr><td colspan="3"></td><td>Current Hazard Rating</td><td>10</td></tr>
<tr><td colspan="3"></td><td colspan="2">Low Risk</td></tr>
</table></td></tr>
</table>

Task 15	GENERAL HANDLING CORROSIVES AT THE ACID BENCH		
	Corrosives (acids and bases) are used for many tasks throughout the process. They are always handled at the acid bench located inside a fume hood. Liquids can disposed of from each of the 9 baths (including 2 slow drainage baths for use in neutralising/diluting corrosives) on the wet bench. Valves located in the 'Disposal Area' control the release of corrosives from the Acid/Wet bench. All corrosives released from the Wet/Acid bench are released directly to the drain. These valves are now labelled.		
Chemical (Examples)	Nitric Acid, fuming	R-phrases	R8, R35
		OEL: 5mg/m^3	STEL: 10mg/m^3
	Phosphoric Acid 85% wt % solution in water	R-phrases	R34
		OEL: 1 mg/m^3	STEL: 2 mg/m^3
	Hydrogen Peroxide 30% wt % solution in Water	R – Phrases	R8, R34
		OEL: 1.5 mg/m^3	STEL: 3 mg/m^3
	Sulphuric Acid 95 – 98 %	R Phrases	R35
		OEL: 1 mg/m^3	STEL: -
	Acetic Acid 99.7+%	R – Phrases	R10, R35
		OEL: 25 mg/m^3	STEL: 37 mg/m^3
	Hydrochloric acid 0.1M	R – Phrases	R34 R37
		OEL: 7 mg/m^3	STEL: 14 mg/m^3
Current Controls	• Safety signage is in place indicating the need to wear eye protection and warning of the presence of acids • Gauntlet type gloves suitable for handling corrosives are worn while working at this area. • Safety visors and aprons must be worn when handling corrosive materials. • The fume hood is annually checked and tested by an external competent ventilation servicing contactor. • Fume hood is operational at all times. • All chemical containers are labelled. • Material safety data sheets (MSDSs) are available in the gowning area and from the nurse. • All students must have MSDSs for chemicals used before commencing experiments. • Both a safety shower and eyewash are present in the area. • No Food or Drink is permitted in the lab. • All undergraduate students must be supervised by a lecturer when working at this acid bench. • At least two people (staff or postgraduate students) must be working in the laboratory when the acid bench is used. • A list of rules for using the acid bench safely are posted above the acid bench. All staff and students must have had these rules explained to them before they can use the acid bench and acids. • Users are advised to inspect their gloves before use for pin pricks/leaks and that the gloves provide protection		

<table>
<tr><td>Current controls</td><td>

Those working at the corrosives wet bench should always wear suitable eye protection and a protective apron as well as suitable gloves.
Those working in the lab should never wear contact lenses.
Laboratory workers should never to carry chemicals around the laboratory in beakers.
Always label mixtures left on the bench for any period of time with details such as the contents, the name of the person responsible, the date that the mixture was prepared.

</td></tr>
<tr><td>Hazards</td><td>Examples For Corrosive substances

R8 Contact with combustible material may cause fire.
R34 Causes Burns
R37 Irritating to the Respiratory System
Contact with combustibles may cause fire
R10 Some substances are flammable (Acetic Acid)

</td></tr>
<tr><td>Current Hazard Rating</td><td>
<table>
<tr><td>Hazard Group</td><td>C</td><td rowspan="4">→</td><td>Severity</td><td>4</td></tr>
<tr><td>Amount Used</td><td>M</td><td>Frequency</td><td>2.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>M</td><td>Probability</td><td>1</td></tr>
<tr><td colspan="2" rowspan="3"></td><td>Number Exposed</td><td>1</td></tr>
<tr><td></td><td>Current Hazard Rating</td><td>10</td></tr>
<tr><td colspan="3"></td><td>Low Risk</td></tr>
</table>
</td></tr>
<tr><td>Recommended improvements</td><td>

Conduct an assessment of protective gloves to ensure that they have suitable resistance to the chemicals being used.
Put in place a procedure for the ongoing maintenance and checking of the emergency shower and eyewash facilities.
Formalise, document and implement a policy for adequate maintenance and testing of the fume hood system.
An unlabeled nitrogen line was noted in this area also, this should be labelled.

</td></tr>
<tr><td>Revised Hazard Rating</td><td>
<table>
<tr><td>Hazard Group</td><td></td><td rowspan="4">→</td><td>Severity</td><td></td></tr>
<tr><td>Amount Used</td><td></td><td>Frequency</td><td></td></tr>
<tr><td>Volatility/Dustiness</td><td></td><td>Probability</td><td></td></tr>
<tr><td colspan="2" rowspan="3"></td><td>Number Exposed</td><td></td></tr>
<tr><td></td><td>Revised Hazard Rating</td><td></td></tr>
</table>
</td></tr>
</table>

Task 16	**ACID STORAGE**					
	Corrosive substances are stored in a dedicated storage cabinet.					
Chemical	Various		R-phrases			
			OEL			
Current controls	• Corrosive containers are held on spill trays within the cabinet to catch any leaks/spills. • The cabinet is ventilated to remove any hazardous emissions. • The cabinet is fitted with self closing doors to maximise containment. • Acids and alkalis are stored on different shelves. • No Food or Drink is permitted in the lab. • Material safety data sheets (MSDSs) are available in the tech room and from the nurse. • All students must have MSDSs for chemicals used before commencing experiments. • Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.					
Hazard	• Contact with corrosive substances					
Current Hazard Rating	Hazard Group	C				
	Amount Used	L				
	Volatility/Dustiness	M	→	Severity	1	
				Frequency	2.5	
				Probability	1	
				Number Exposed		
				Current Hazard Rating	**2.5**	
				Acceptable		
Recommended improvements	1. Place suitable signage on the corrosive cabinet identifying the presence of corrosives. 2. When storing corrosives, ensure that bottles are clean on the outside and that the lid is tight and secure to prevent leakage of vapors or liquids. 3. Always add acids to water. Adding water to an acid causes a highly exothermic reaction which can cause a fire and release dangerous gases into the air. 4. Put in place a procedure for the ongoing maintenance and checking of the emergency shower and eyewash facilities.					

<table>
<tr><td>Task 17</td><td colspan="4">DISPOSAL OF CORROSIVES
Liquids can disposed of from each of the 9 baths (including 2 slow drainage baths for use in neutralising/diluting corrosives) on the wet bench.
Valves located in the ‘Disposal Area’ control the release of corrosives from the Acid/Wet bench. All corrosives released from the Wet/Acid bench are released directly to the drain.
It was noted that valves were not labelled to indicate the bath to which they corresponded.</td></tr>
<tr><td>Chemical</td><td colspan="2">Various</td><td>R-phrases</td><td>R34, R35
OEL Various</td></tr>
<tr><td>Current controls</td><td colspan="4">• Safety signage is in place indicating the need to wear eye protection and warning of the presence of acids.
• Gauntlet type gloves suitable for handling corrosives are worn while working at this area.
• The fume hood is annually checked and tested by an external competent ventilation servicing contactor.
• Fume hood operational at all times.
• All chemical containers are labelled.
• Material safety data sheets (MSDSs) are available in the tech room and from the nurse.
• All students must have MSDSs for chemicals used before commencing experiments.
• Acids are diluted with water in large slow drainage baths, and then released down to the drain.
• Both a safety shower and eyewash are present in the area.
• No Food or Drink is permitted in the lab.
• Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.
• All valves for disposal through the drain are labelled.</td></tr>
<tr><td>Hazard</td><td colspan="4">• Corrosive substances
• Release of incorrect substance to drain</td></tr>
<tr><td>Current Hazard Rating</td><td colspan="4">
<table>
<tr><td>Hazard Group</td><td>C</td><td rowspan="3">→</td><td>Severity</td><td>4</td></tr>
<tr><td>Amount Used</td><td>M</td><td>Frequency</td><td>2.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>M</td><td>Probability</td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>Number Exposed</td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>Current Hazard Rating</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td colspan="2">Low Risk</td></tr>
</table>
</td></tr>
<tr><td>Recommended improvements</td><td colspan="4">1. An unlabeled nitrogen line was noted in this area also, this should be labelled.
2. Formalise, document and implement a policy for adequate maintenance and testing of the fume hood system.
3. Always add acids to water. Adding water to an acid causes a highly exothermic reaction which can cause a fire and release dangerous gases into the air.
4. Conduct an assessment of protective gloves to ensure that they have suitable resistance to the chemicals being used.
5. Put in place a procedure for the ongoing maintenance and checking of the emergency shower and eyewash facilities.</td></tr>
</table>

Task 18	**GENERAL WORK WITH SOLVENTS**		
	All solvents are handled at the solvent bench. The solvent bench is located within a fume cupboard.		
Chemical	Various	R-phrases	Various
		OEL	Various
Current controls	• Solvent bench located within a fume cupboard. • Solvents (acetone and 1- propanol), photoresists and developers are the only substances that should be used at this bench. • Solvents, photoresist developers are not stored on this bench. • Fume hood operational at all times • Local exhaust ventilation (LEV) fitted to the fume cupboard. • LEV regularly maintained and tested. • All chemical containers are labelled. • Both a safety shower and eyewash are present in the area. • No Food or Drink is permitted in the lab. • Material safety data sheets (MSDSs) are available in the tech room and from the nurse. • All students must have MSDSs for chemicals used before commencing experiments. • Warning labels are placed on the fume cupboard indicating the nature of the hazard associated with the solvents in use. • Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.		
Hazards	**Examples** • R11 Highly flammable • R41 Risk of serious damage to eyes • R66 Repeated exposure may cause skin dryness and cracking • R67 Vapours may cause drowsiness & dizziness • Some solvents may permeate unbroken skin (Sk)		
Recommended improvements	1. Conduct an assessment of protective gloves to ensure that they have suitable resistance to the chemicals being used. 2. Put in place a procedure for the ongoing maintenance and checking of the emergency shower and eyewash facilities. 3. Ensure that all concerned are aware that acids/bases are not to be used at this bench due to the potentially highly reactive nature of mixtures of these substances.		

Task 19	**SOLVENT DISPOSAL**		
	All solvents are handled at the solvent bench. The solvent bench is located within a fume cupboard. Solvent are used for cleaning wafers.		
Chemical	Various solvents	R-phrases	
		OEL	
Current controls	• Solvent bench located within a fume cupboard. • Fume hood operational at all times • Local exhaust ventilation (LEV) fitted to the fume cupboard. • LEV regularly maintained and tested. • All chemical containers are labelled. • Solvents such as ethanol are poured down the drain with water dilution. • Both a safety shower and eyewash are present in the area. • No Food or Drink is permitted in the lab. • Material safety data sheets (MSDSs) are available in the tech room and from the nurse. • All students must have MSDSs for chemicals used before commencing experiments. • Lab safety training must be carried out before staff and students can use the solvent bench.		
Hazards	• Solvent exposure though inhalation, ingestion, and skin contact/absorption.		
Recommended improvements	1. Place warning labels on the fume cupboard indicating the nature of the hazard associated with the solvents in use. 2. Conduct an assessment of protective gloves to ensure that they have suitable resistance to the chemicals being used. 3. Put in place a procedure for the ongoing maintenance and checking of the emergency shower and eyewash facilities.		

<table>
<tr><td>Task 20</td><td colspan="4">PHOTORESIST APPLICATION</td></tr>
<tr><td></td><td colspan="4">Photoresist is deposited on wafers using the spinning machine located at the solvent bench within the fume cupboard.</td></tr>
<tr><td>Chemical</td><td colspan="2" rowspan="2">2-methoxy-1-methyl-ethyl acetate</td><td>R-phrases</td><td>R10 R36</td></tr>
<tr><td>OEL</td><td>TWA: 275 mg/m^3
STEL: 550 mg/m^3</td></tr>
<tr><td>Current controls</td><td colspan="4">• Both a safety shower and eyewash are present in the area.
• Users wear PPE as prescribed in the solvent bench safety rules.
• Users hold the container not closer than 2cm from the spinner during pouring.
• Material safety data sheets (MSDSs) are available in the tech room and from the nurse.
• All students must have MSDSs for chemicals used before commencing experiments.
• No Food or Drink is permitted in the lab.
• This substance is currently handled only in the fume hood.
• Protective gloves are worm while handling this substance
• Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.
• Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.</td></tr>
<tr><td>Hazard</td><td colspan="4">Photoresist: this substance is classified as being flammable and irritating to the eyes. It contains in excess of 2-methoxy-1-methyl-ethyl-acetate which is skin permeable.</td></tr>
<tr><td>Current Hazard Rating</td><td colspan="4">
<table>
<tr><td>Hazard Group</td><td>C</td><td rowspan="3">→</td><td>Severity</td><td>1</td></tr>
<tr><td>Amount Used</td><td>S</td><td>Frequency</td><td>2.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>1</td><td>Probability</td><td>1</td></tr>
<tr><td colspan="3"></td><td>Number Exposed</td><td>1</td></tr>
<tr><td colspan="3"></td><td>Current Hazard Rating</td><td>2.5</td></tr>
<tr><td colspan="3"></td><td colspan="2">Acceptable</td></tr>
</table>
</td></tr>
<tr><td>Recommended improvements</td><td colspan="4">1. Conduct an assessment of protective gloves to ensure that they have suitable resistance to the chemicals being used.
2. Put in place a procedure for the ongoing maintenance and checking of the emergency shower and eyewash facilities.</td></tr>
<tr><td>Revised Hazard Rating</td><td colspan="4">
<table>
<tr><td>Hazard Group</td><td></td><td rowspan="3">→</td><td>Severity</td><td></td></tr>
<tr><td>Amount Used</td><td></td><td>Frequency</td><td></td></tr>
<tr><td>Volatility/Dustiness</td><td></td><td>Probability</td><td></td></tr>
<tr><td colspan="3"></td><td>Number Exposed</td><td></td></tr>
<tr><td colspan="3"></td><td>Revised Hazard Rating</td><td></td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>Task 21</td><td colspan="6">PHOTORESIST DELEVOPER APPLICATION</td></tr>
<tr><td></td><td colspan="6">Developer is deposited on wafers in the solvent bench fume cupboard.</td></tr>
<tr><td>Chemical</td><td colspan="3" rowspan="2">Tetramethylammonium hydroxide</td><td>R-phrases</td><td colspan="2">R21 R36/38</td></tr>
<tr><td>OEL:</td><td colspan="2">None available</td></tr>
<tr><td>Current controls</td><td colspan="6">• Both a safety shower and eyewash are present in the area.
• Material safety data sheets (MSDSs) are available in the tech room and from the nurse.
• All students must have MSDSs for chemicals used before commencing experiments.
• No Food or Drink is permitted in the lab.
• This substance is currently handled only in the fume hood.
• Protective gloves are worn while handling this substance
• Three different lab safety training courses are available for students, equipment users and lecturers/supervisors.
• Developer is only handled at the solvent bench within the fume hood.</td></tr>
<tr><td>Hazard</td><td colspan="6">Causes burns. Harmful if swallowed and in contact with skin.
• Harmful
• R21 Harmful in contact with skin
• R36/38 Irritating to the eyes and skin</td></tr>
<tr><td>Current Hazard Rating</td><td>Hazard Group</td><td>C</td><td rowspan="4">→</td><td>Severity</td><td>1</td></tr>
<tr><td>Amount Used</td><td>S</td><td>Frequency</td><td>2.5</td></tr>
<tr><td>Volatility/Dustiness</td><td>M</td><td>Probability</td><td>1</td></tr>
<tr><td colspan="3"></td><td>Number Exposed</td><td>2</td></tr>
<tr><td colspan="3"></td><td>Current Hazard Rating</td><td></td></tr>
<tr><td colspan="3"></td><td colspan="2">Acceptable</td></tr>
</table>

Task 22	**ARGON GAS IN THE SPLUTTER DEPOSITION COATER MACHINE**					
	When this task commences a valve is turned on to start the addition of argon gas to the system to provide an inert atmosphere. The gas control valve is inside the body of the machine adjacent to a transformer and a pump. There is an interlock on this chamber, however, this has to be disconnected to allow access to the gas control valve. The flow of argon gas is turned off again at the end of the task. Argon is supplied at a very slow flow.					
Chemical	Argon	R-phrases	None			
		OEL	Asphxyiant			
Current controls	• Oxygen detector in the laboratory to detect potential oxygen deficient atmospheres. • Material safety data sheets (MSDSs) are available in the tech room and from the nurse. • Three different lab safety training courses are available for students, equipment users and lecturers/supervisors. • All students must have MSDSs for chemicals used before commencing experiments. • Only competent staff use this piece of equipment and no undergraduate uses this machine.					
Hazard	Argon is an asphxyiant gas and may build up in an area to produce an oxygen deficient atmosphere.					
Current Hazard Rating	Hazard Group	A				
	Amount Used	S				
	Volatility/Dustiness	H	→	Severity	1	
				Frequency	2.5	
				Probability	1	
				Number Exposed	2	
				Current Hazard Rating	**5**	
				Acceptable		
Recommended improvements	1. Re-locate the gas control valve outside the chamber where it can be more easily reached. 2. Implement a procedure for ensuring that argon gas flow is switched off after use.					

Task 23	**SOLVENT STORAGE**		
	Solvent are stored in a dedicated solvent storage cabinet.		
Chemical	Various	R-phrases	
		OEL	
Current controls	• Both a safety shower and eyewash are present in the area. • No Food or Drink is permitted in the lab. • Material safety data sheets (MSDSs) are available in the tech room and from the nurse. • All students must have MSDSs for chemicals used before commencing experiments.		
Hazard	Various		
Recommended improvements	1. Place suitable signage on the solvent cabinet identifying the presence of solvent flammables. 2. When storing solvents, ensure that bottles are clean on the outside and that the lid is tight and secure to prevent leakage of vapours or liquids. 3. Put in place a procedure for the ongoing maintenance and checking of the emergency shower and eyewash facilities.		

Task 24	**DEALING WITH CHEMICAL SPILLS**		
	A range of corrosives and solvents are used in the laboratory. At any time a spill may occur		
Chemical	Various	R-phrases	
		OEL	
Current controls	• Two spill kits are available in the laboratory. • Chemical spill training is provided. • Material safety data sheets (MSDSs) are available in the tech room and from the nurse. • All students must have MSDSs for chemicals used before commencing experiments. • No Food or Drink is permitted in the lab. • Three different lab safety training courses are available for students, equipment users and lecturers/supervisors. • Both a safety shower and eyewash are present in the area.		
Hazard	• Corrosive substances • Release of incorrect substance to drain.		
Recommended improvements	1. Conduct an assessment of protective gloves to ensure that they have suitable resistance to the chemicals being used. 2. Put in place a procedure for the ongoing maintenance and checking of the emergency shower and eyewash facilities.		

APPENDIX I
CHEMICAL AGENTS RISK ASSESSMENT METHODOLOGY

APPENDIX I
DETERMINATION OF THE HAZARD RATING

The Hazard Rating for each individual task is determined using the following formula:

Hazard Rating = S x F x P x N

Where: **S** is related of the severity of any injuries that may occur as a result of exposure to the chemical
F is a measure of the frequency of the task
P is a measure of the probability of an injury occurring
N is dependant on the number of people exposed

STEP 1 Severity Factor (S)

This involves a five-step process, and uses information related to the hazard group of the chemicals involved, the amount being used and the volatility or dustiness of the chemical.

STEP 1A Hazard Group

Use the R-phrases associated with the chemical to determine the appropriate Hazard Group from the table below:

A	B	C	D	E
R36 R36/38 R38 Plus all substances that do not have R-phrases in groups B to E	R20 R20/21 R20/21/22 R21 R21/22 R22	R23 R23/24 R23/24/25 R23/25 R24 R24/25 R25 R34 R35 R36/37 R36/37/38 R37 R37/38 R41 R43 R48/20 R48/20/21 R48/20/21/22 R48/21 R48/21/22 R48/22	R26 R26/27 R26/27/28 R27 R27/28 R28 Carc Cat 3 R40 R48/23 R48/23/24 R48/23/24/25 R48/23/25 R48/24 R48/24/25 R48/25 R60 R61 R62 R63	Muta Cat 3 R40 R42 R42/43 R45 R46 R49

STEP 1B Amount being used

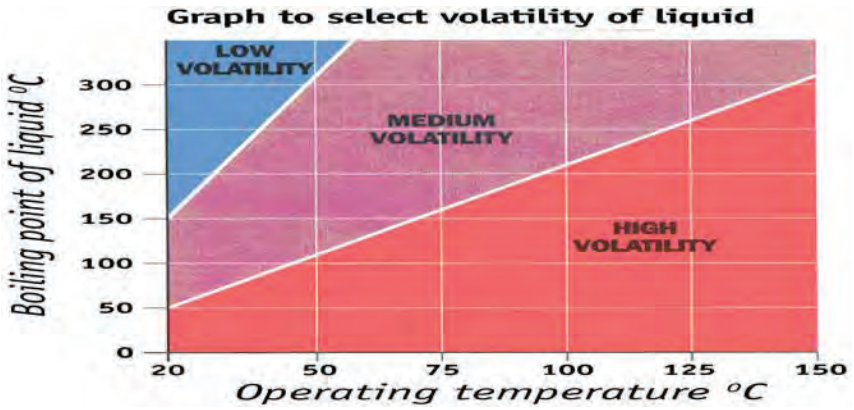
Determine whether the amount of the chemical being used is small, medium or large from the following table, Table 1

	Small	Medium	Large
Weight	Less than 500g	500g to 500kg	More than 500kg
Volume	Less than 500ml	500ml to 500l	More than 500l

Table 1

STEP 1C Volatility/Dustiness

For **liquids** determine whether the chemical is of low, medium or high volatility using the boiling point and operating temperature of the chemical and the graph below:



For **solids** determine whether the chemical is low, medium or high dustiness using the following definitions:

Low Dustiness	Pellet-like solid Little dust produced or seen
Medium Dustiness	Crystalline solid Dust is visible but settles quickly Dust on surfaces
High Dustiness	Fine light powder Dusts clouds produced Dust is visible and remains in the air

STEP 1D Control Approach

Use the hazard group, amount being used and volatility/dustiness to find the control approach from the table below:

Amount Used	Low dustiness or volatility	Medium volatility	Medium dustiness	High dustiness or volatility
	Hazard Group A			
Small	**1**	**1**	**1**	**1**
Medium	**1**	**1**	**1**	**2**
Large	**1**	**1**	**2**	**2**
	Hazard Group B			
Small	**1**	**1**	**1**	**1**
Medium	**1**	**2**	**2**	**2**
Large	**1**	**2**	**3**	**3**
	Hazard Group C			
Small	**1**	**2**	**1**	**2**
Medium	**2**	**3**	**3**	**3**
Large	**2**	**4**	**4**	**4**
	Hazard Group D			
Small	**2**	**3**	**2**	**3**
Medium	**3**	**4**	**4**	**4**
Large	**3**	**4**	**4**	**4**
	Hazard Group E			
	For all Hazard Group E substances, use control approach 4			

Table 2

STEP 1E Severity Factor (S)

Use the table below to determine the severity factor from the control approach:

S = Severity of injury that could occur		
		Severity Factor
Control Approach 1	**General Ventilation** A good standard of general ventilation and good working practices	**1**
Control Approach 2	**Engineering Control** Typically local exhaust ventilation ranging from a single point extract close to the source of the hazards, to a ventilated partial enclosure. It includes other engineering methods of control, e.g. cooling coils for vapours, but not complete containment	**3**
Control Approach 3	**Containment** The hazard is contained, or enclosed, but small-scale breaches of containment may be acceptable. Often used where a substance is very hazardous or a lot of it is likely to get into the air	**4**
Control Approach 4	**Special** Expert advice is needed in selecting control measures and you should seek further help	**6**

Table 3

STEP 2 Frequency Factor (F)

Determine the Frequency Factor using the following table:

F = FREQUENCY OF TASK	
	FREQUENCY FACTOR
> ANNUALLY	0.1
ANNUALLY	0.2
MONTHLY	1
WEEKLY	1.5
DAILY	2.5
HOURLY	4
CONTINUOUSLY	5

Table 4

STEP 3 Probability Factor (P)

Determine the Probability Factor using the following table. The effect of any preventative measures taken, the results of any exposure monitoring previously and the circumstances of the work undertaken should be considered.

P = Probability of an injury occurring		
		Probability Factor
Impossible	It is inconceivable that injury could happen	**0.1**
Unlikely	It is conceivable that injury could happen though it is very unlikely	**1**
Possible	Injury could occur but its occurrence would be unusual	**2**
Even chance	Injury could occur	**3**
Probable	Injury is sufficiently probable or no surprise when it happens	**4**
Likely	The occurrence of an injury is to be expected	**5**
Certain	It is almost certain that injury will occur	**6**

Table 5

STEP 4 Number Factor (N)

Determine the Number Factor using the following table:

N = Number of people exposed	
	Number Factor
1 to 2 persons	1
3 to 7 persons	2
8 to 15 persons	3
16 to 50 persons	4
More than 50 persons	5

Table 6

STEP 5 Hazard Rating Number

Calculate the hazard rating number using the following formula:

Hazard Rating = S x F x P x N

GUIDE FOR GRADING HAZARD RATING NUMBERS

Hazard Rating Number	Interpretation
0 – 5	Acceptable Risk
5 – 15	Low Risk
15 – 40	Significant Risk
40 – 100	High Risk
> 100	Extreme Risk

Table 7

TU Dublin - Tallaght

National Center for Applied Microelectronics

Cleanroom Users Manual

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1.0 POLICIES AND PROCEDURES FOR ENTERING THE CLEANROOM

A Class 10 cleanroom is defined as having less than 10 particles of more than 0.5 micron in size within a cubic metre of air. Similarly, a Class 1000 cleanroom has less than 1000 particles of more than 0.5 micron in size within a cubic metre of air. This level of cleanliness is necessary to maintain the reproducibility of newly developed state-of-the-art electronic device processes. To reach and maintain this level of cleanliness, the transfer of particle and chemical contaminations must be eliminated wherever they are found.

When in the cleanroom, be aware of your knowledge limitations. It is extremely important that you ask someone for help if you are unsure about the operation of these facilities..

1.1 Rules for entering the cleanroom.

- The required Attire for Class 1000 cleanroom are: Hood or cap, Coverall, Booties, PVC gloves
- Keep all hair and ears covered with hood or cap.
- Men with beards or mustaches must wear masks in Class 1000 areas.
- Never open your gown in the cleanroom.
- Never touch your skin with your gloves. If you do, put a clean set of gloves on immediately.
- Only authorized users may enter the cleanroom unescorted.
- Visitors must be escorted by a cleanroom qualified faculty/staff member.
- No food or drink is permitted in the cleanroom.
- No corrugated cardboard, styrofoam, foam rubber or non-cleanroom paper is permitted in thecleanroom.
- No pencil, erasers or retractable pens are permitted in the cleanroom.
- Be considerate. (Clean up your own mess, don't mess up someone else's work, order new supplies if they are needed.
- Ask for permission before bringing anything in or taking anything out of the cleanroom.
- DO NOT modify equipment without the approval of the equipment committee. IF YOU AREN'T SURE HOW IT WORKS, ASK BEFORE YOU USE IT!

1.2 Enforcement of Rules

The policies and procedures described here are intended to ensure the safety of our users, protect the very complex and expensive equipment in the cleanroom and to create an environment in which many different research groups can co-exist peacefully. It is expected that the cleanroom users will police themselves by encouraging and assisting one another in adhering to these policies. Flagrant or repeat offenders will be penalized, typically through suspension or expulsion from the cleanroom. The conditions of the penalties will be set by the cleanroom committee.

1.3 Gowning Requirements

Class 1000
mask Hood or cap
Coverall
Booties
PVC gloves.4

Rules

- All hair and articles of clothing will be covered to the maximum extent possible before entering the cleanroom. Suits will be snapped or zipped all the way to the top and hood completely tucked in.
- Gloves will be worn at all times. No bare hands or fingers.
- Cleanroom garments shall be worn only within the cleanroom complex, except under emergency conditions.
- Only flat or very low heeled shoes may be worn. No sandals or open toe shoes.
- Do not wear soiled, dirty, or lint-producing street clothes under cleanroom garments.
- Do not hang street clothes or lab coats in the gown cabinets.
- Face masks are to be worn over the top of the nose.
- Never open gown in the cleanroom.
- See separate gowning procedure hanging in the gowning area.

1.4 Training for cleanroom use

The following courses must be completed before entering the cleanroom. The staff, students and visitors should follow some of these points equally.

***Introduction course*:** Cleanroom is considered as a chemical laboratory and nearly in all rooms there are chemicals and evaporates. This course gives general information about the cleanroom and it's content and the importance of cleanness and hazards when entering the cleanroom. This course is necessary for whoever entering the cleanroom but is not enough to allow anyone to enter the cleanroom.

***Safety course*:**
Includes all the safety points for entering the cleanroom. By far the dirtiest thing in the cleanroom is the people who use it. Even the most careful person can generates particles

from their skin, hair, clothing and breath. This course should cover 3 major points as follows:
a) Proper gowning procedure.
b) Sets of Dos and Don'ts in the clean room.
c) Emergency exits and fire alarm
The purpose of the safety policy is to ensure that all persons entering the cleanroom can perform their activities safely. That means in such a way that damage to personal health or physical injury, and also material damage, is avoided. This relates to activities that are carried out in the personal work area and to the general lab facilities. Completing the introduction and this course allow staff, students and visitors to enter the cleanroom with a guide, but doesn't allow them to work in the cleanroom.

***Work procedure course*:** Includes information about handling materials and dealing with chemicals in the cleanroom. In order to work in the cleanroom all students and staff should complete the three courses. Undergraduate students are not allowed to work in the cleanroom without the guide. Postgraduate students should start working under the guidance of their supervisor for a while before they are allowed to work on their own. The program for cleanroom work procedure is set by the Department of Electronic Engineering.

The courses can be run as necessary. The staff/students must start working in the cleanroom within a month after completion of the courses, otherwise they will have to follow the refreshment course, in the meantime have no 'right to work' in the cleanroom.

1.5 Buddy System

The buddy system should be used in the cleanroom while performing tasks that potentially could cause serious injury. As implemented here, the buddy system requires that a minimum of two people in the cleanroom at these times. Buddies do not have to be authorized cleanroom users, but if they are not they must remain outside the cleanroom under all (including emergency) circumstances. A telephone and list of emergency phone numbers are located in the gowning area outside the cleanroom.

1.6 Visitors

Whenever possible, visitors should remain outside the cleanroom. If a visitor must enter the cleanroom, he or shemust be escorted by a cleanroom qualified faculty/staff member. The visitor must be bought the introduction to the clean room course. The escort will be responsible for ensuring that the visitor follows the facility policies and procedures.

1.7 Procedures for working in the cleanroom

- Emergency exit doors are ***ONLY*** for **EMERGENCIE**S, such as fire or explosion in the lab, or for the movement of very large pieces of equipment in and out of the cleanroom. In case of an alarm, exit immediately, DO NOT take time to remove your gown until you are clear of the building.
- Do not walk around unnecessarily and be cautious when approaching another work area. Personnel movement is to be restricted to minimize the stirring up of settled particulate matter.
- Excess storage in the cleanroom is not permitted.
- If you turn it ON, remember to turn it OFF.
- If you make a mess, clean it up. Return everything to its original condition, or if you want to be loved/appreciated, leave conditions a little better than you found them. This includes your entire set-up for experiments or projects.
- At no time will paper in any form be torn or mutilated within the cleanroom. Corrugated cardboard, Styrofoam, or foam rubber ***of any type*** will not be allowed in the cleanroom without plastic containment and prior approval.
- Remove cartons and packaging material ***before*** taking materials into the cleanroom area.
- Pencils, erasers, and retractable pens shall not be used within environmentally controlled areas. Non-retractable ball-point pens are approved for writing purposes (non-retractable and without pocket clips).
- Users will make proper entry each time a piece of equipment is used that has a log book.
- Hot plates (one of the main causes of cleanroom fires):
  Never leave on when unattended
  Make ***SURE*** that the temperature is: 20^{o}C BELOW flash point of contents and 20^{o}C BELOW melting point of beaker materials.
- Be aware of supplies. If quantities of stock appear to be low, report it to the Technician.
- Do not remove dedicated items from the cleanroom.
- If you are using equipment or have constructed a special equipment set-up, leave a note on the equipment to that effect. Limit your set-up to a reasonable time period; otherwise make special arrangements.
- Do not disturb a set-up without the permission of its user.
- If you think you may have accidentally messed up someone's work or equipment, please try to find whose it is and what to do about it.
- Do not contaminate the Nitrogen blow off guns.
  When spinning photo resist, do not allow photo resist to clog the vacuum port in the spindle, potentially causing your sample to fly off of the chuck. Clean the wafer spinner after use.

1.8 Wafer Handling

- NEVER sneeze, cough, or spit toward your wafers even with a mask. Resulting spots are non-removable.
- Never speak towards your wafer.
- Avoid passing anything over your wafer which may release particles (i.e., don't look down on your wafer, don't cover the wafer with your hand).
- Whenever possible, store wafers in ***covered*** containers.

1.9 Tools and Repairs

- Clean all equipment followed by an Isopropyl alcohol wipe before taking it into the cleanroom.
- No equipment will be modified without prior approval of the equipment committee.
- No new equipment will be moved into the cleanroom.
- Keep parts and tools at the work station as clean and orderly as possible. Use tool boxes where possible.
- Any work or tools dropped on the floor shall be considered contaminated, and must be cleaned.
- Never leave exposed critical parts on the workbench.
- Work on a clean surface.
- Operations such as lapping, filing, and heavy soldering are prohibited in the cleanroom, except where contamination is isolated and exhausted from the clean areas.

1.10 Good Manners and Good Sense

- Obey signs on equipment or in specific areas.
- Refill squirt bottles that you find empty.
- Replace solvent or acid jugs that you empty with full jugs.
- Let empty solvent jugs evaporate dry. Rinse acid and solvent jugs three times with tap water before placing in trash cans.
- When working with acids or solvents, wear chemical resistant latex gloves. Before using the gloves, be sure they are in good shape. Replace them if they are not.
- Do not dump solvents down the drains.
- When disposing of acid mixtures, dilute with lots of tap water.
- Label all mixtures with:
  CONTENTS with ratios (i.e.,H_2SO_4:H_2O)(1:1)
  NAME of person who prepared the mixture
  DATE mixture was prepared and time.

1.11 Habits

- If your glove touches bare skin, (i.e., your forehead) replace your gloves immediately.
- Avoid scratching or rubbing your head or exposed skin areas.
- Never comb or brush hair within the cleanroom or gowning area.
- Limit the use of cosmetics, colognes, and perfumes in the cleanroom and gowning areas as much as possible.
- No eating, chewing, or smoking shall be allowed in any environmentally controlled areas.

1.12 General

- Personal items such as combs, cigarettes, matches, tissues, and similar particle-shedding products shall not be carried into the cleanroom. Such items may be carried into controlled areas in street clothes pockets, provided they are not removed from the pockets within the clean area.
- Do not wear jewelry, except plain wedding bands, watches, and pierced ear studs.
- Report adverse changes in environmental conditions (particle generation or accumulation, marked changes in humidity or temperature) and/or changes in your physical condition (profuse a nasal discharge, skin conditions, etc.) to the technician or the lecturer in charge.
- No mobile phones in cleanroom.

1.13 Personal Hygiene

Personnel with colds, temporary sneezing and coughing, and severe sunburns should not enter the cleanroom until they have recovered. The high degree of cleanliness required necessitates the development of the following habits:
A. Bathe frequently
B. Shampoo regularly and take action to control dandruff.
C. Wear clean under and outer garments.
D. Do not wear wholly or worn out shoes.

1.14 Final Note

The intent of these policies and procedures is to ensure an environment where researchers can work together safely and productively while maintaining the integrity of the cleanroom environment and equipment. These policies and procedures will certainly change with time as the personality of our laboratory becomes more clearly understood. Users are strongly encouraged to make suggestions on how we can more effectively manage the cleanroom.

2.0 EQUIPMENT SCHEDULE RULES

- Schedule runs in advance when possible. Do not become an equipment hog.
- Post your runs on schedule sheet even if not pre-scheduled.
- Comply with your schedule, 15 minutes maximum hold-over, you then lose your queue position.
- Overnight processing must be scheduled and agreed with the technician.
- Remove tooling (boats, etc.) from systems and clean-up particles from process chamber.

3.0 EMERGENCY RESPONSE PROCEDURES

3.1 Introduction

We use many potentially dangerous chemicals in the cleanroom and the possibility of a major spill always exists. It is necessary to know how to react quickly and properly to any chemical spill to avoid injury, death or major equipment damage. A large acid spill, HF for instance, might cause serious injury or even death if handled improperly. These procedures are intended only to provide guidelines. Common sense should always be used when dealing with any chemical spill. Safe practices should be foremost on your mind whenever you are in the cleanroom.

3.2 MSDS sheets

The MSDS sheet for each chemical kept in the cleanroom is be placed in the gowning area press. Your understanding of the MSDS information for each chemical you use is necessary for your continued safety in the cleanroom environment. Please look over the MSDS for each chemical you will be using so that you will at least understand its dangers and how to deal with it.

3.3 Emergency Procedures

In the case of an emergency or hazardous situation during office hours contact one of the names listed below immediately. Out of office hours contact security for a list of contact names and numbers

1. In case of fire.

- If the fire is small tackle with the fire extinguishers in the room.
- Press the one of the red emergency buttons in the room.
- Get out immediately without removing your clean room suits.
- Contact security immediately.

2. In case of chemical splash or spill to a person

- If an acid or a liquid with unknown origin is spilt on you get under the emergency shower immediately
- Your buddy should press the emergency button in the room
- Stay under the shower for at least 10 minutes
- Contact the nurse immediately but if not available call 999

3. In case of chemical splash to the eyes

- Go immediately to the emergency eyewash station and rinse your eyes for at least 15 minutes.
- Your buddy will press the red emergency button
- Contact the nurse immediately but if not available call 999

4. In case of large chemical spill in the room

- Assess the hazard
- Identify the hazard
- Get out of the immediate area
- Contact one of the names below who will instigate the proper response

Note. The user must inform all other users of the emergency or hazard, and all users must leave the clean room immediately. Those persons knowledgeable of the emergency condition should position themselves at the front entrance to provide direction to the emergency services. Provide only factual information.

3.4 Contact Numbers

Ouside of office hours

In case of emergency or hazardous situation one of the following are to be contacted immediately

Name	**Phone**	**Mobile**
Paul Tierney	404 2393	085 7771717
James Wright	404 2502	N/A
TJ Ennis	045 861526	N/A
Fathi Akkari	N/A	N/A
Andrew Pender	N/A	N/A

During office hours

Name	**Contact Ext.**
Paul Tierney	2393
James Wright	2502
TJ Ennis	2819
Andrew Pender	2760
Fathi Akkari	2737

3.5 Spill Response Cart Items

- Caution Tape
- Leak Block Granules
- Absorbent Booms
- Absorbent Sheets
- Neutralizers

4.0 CLEANROOM GOWNING PROCEDURE

I. Introduction

By far the dirtiest thing in our cleanroom will be the people who use. it. Even the most carefully manicured person generates a shroud of particles from their skin, hair, clothing, and breath. Consequently, all cleanroom users must wear cleanroom garments which trap and hold the particles emitted by their bodies and clothing.

4.1 Gowning and gowning-down procedures

Gowning up

- **Booties**: Put on the blue booties immediately upon entering the gowning room
- **Hairnet** : Put the hairnet (bouffant cap) and ensure it covers all your hair
- **Gloves**: Put on the cleanroom gloves carefully ensuring that you touch the outside of the glove as little as possible.
- **Suit**: Put on the cleanroom suit without letting it touch the ground.
- **Glasses**: Put on the glasses. They may be cleaned in IPA/DI before use.
- **Check:** Immediately move to the cleanroom side of the swing over bench and check yourself in the mirror.

Gowning down

- **Suit**: Remove suit at the *dirty* side of the swing over bench
- **Glasses:** Remove glasses
- **Hairnet**: Remove hairnet at the dirty side of the gown room and dispose
- **Gloves**: Gloves can be disposed outside the gown room.
- **Booties**: wear booties until outside the gown room and dispose

5.0 CLEANROOM ETIQUETTE

5.1 Non-Functional Equipment

Frequently, lab equipment stops working or gets damaged during normal use. Whenever something does not work, please give it to Paul Tierney who will then either repair it or decide if it needs to be disposed of. Lab equipment is inherently expensive so it helps everybody when we can avoid buying new equipment needlessly.

5.2 Disposal of Sharp Objects

With all the glassware used in the cleanroom, obviously breakage will occur, or things will get contaminated beyond the point of being cleanable. If you find glassware meeting this description, please be sure to throw it into the container in the solvent fumehood. This also applies to the following materials: wafers, razor blades, needles, microscope slides and cover slips, and anything else that is questionable.

5.3 Labeling parts left in the fumehood

Frequently, cleanroom users will need to leave things under the fume hoods overnight or for part of the day unattended. Our policy here is simple: ANYTHING left unattended MUST be labeled with your and your supervisor's NAME, PHONE NUMBER WHERE YOU REALLY CAN BE REACHED, WHAT IT IS THAT IS SITTING THERE, and the DATES AND TIME of when you left it AND when you will return to get it. We will THROW OUT anything not appropriately labeled.

5.4 Disposal of Solvent- and Photoresist-Soaked Materials

While many folks think of the solvents we commonly use as "safe, the fact of the matter is that they all can be dangerous if you get exposed to them enough. We have a container in the cleanroom specifically for the disposal of solvent-soaked materials (in the solvent fumehood), and require it is used for the disposal of all such materials. While it may seem like a couple of IPA Wipes with photoresist on them isn't that bad, just remember that the air in the cleanroom is constantly recirculated, so all those vapors will find their way back in eventually for everyone to breathe.

The following materials should be put in the solvent cans:
Any alcohols (ethanol, methanol, isopropanol, etc.)
Acetone
TCE (Trichloroethane)
Chlorobenzene (this stuff is particularly dangerous)
Photoresist and related products.

5.5 Cleaning Up

All cleanroom users are responsible for cleaning up their own mess. You should put away all tools, throw away all wipers and disposable items, and thoroughly clean all glassware. Make it look as though you were never there, or better yet, make it look better than it was before you were there. If you find a beaker that someone else left dirty, why not wash it while you are washing your own?

5.6 What If I See Someone Else Doing Something Wrong?

From time to time, people will have other things on their mind and unintentionally do something they really shouldn't do. Most people don't mind a friendly reminder now and then. It's up to the users to keep the cleanroom operating smoothly, and as long as everyone cooperated then the chances of ruined projects, injuries, and problems in general is greatly reduced. If anyone has a problem with being politely told about something that may endanger somebody, tell the staff about it and we will take care of the problem.

6.0 Cleanroom rules for undergraduate students

General Rules

- Undergraduates only work in the laboratory under the supervision of a member of staff.
- The member of staff must ensure that the student only works on equipment and materials that he/she has been assigned to.
- The students must have undergone a laboratory training and introduction before any classes in the laboratory.
- Safety glasses must be worn at all times in the laboratory.
- Only final year Honours Degree students may work in the laboratory. Other students observe demonstrations.
- Only work that needs clean room conditions should be done in the clean room.
- All chemicals and glassware should be kept in proper storage cabinets.
- All equipment should have a log- book where users should sign-in each time it is used.

Solvent bench

- All chemicals to be used by the students must be prepared and left in the solvent bench before the laboratory class.
- Diploma students may only work at the solvent bench under the supervision of a member of staff.
- The student only uses chemicals in labeled bottles that are assigned to the work being carried out.
- Only one solvent should be used at a time.
- Only solvents should be used at the solvent bench.
- Wafers should be rinsed with water and dried before moving them to another bench.
- All work should be done under the fume hood.

Acid bench

- No undergraduate is to use the HF solution or concentrated acid solutions.
- Safety gloves and equipment must be used by any person handling HF.
- The student only uses acid solutions in labeled bottles that are assigned to the work being carried out.
- Ordinary Degree students may only work at the acid bench under the supervision of a member of staff.
- Work at the acid bench can only be carried out under the supervision of a member of staff.
- Extra gloves and protective clothing must be worn while handling concentrated acids.

- Wafers should be rinsed with water and dried before moving them to another bench.
- All work should be done under fume hood.

Sputter deposition

- Undergraduate students only use the sputter coaters under the supervision of a member of staff.
- All materials used in the sputter coater, must be agreed on by the microelectronics laboratory committee.
- When possible the evaporation unit should be used for teaching purposes and metal deposition.

Aligner

- Undergraduate students cannot use the aligner without the supervision of a member of staff.

Furnace

- Undergraduate students cannot use the furnace without the supervision of a member of staff.

Spinner and photoresist deposition

- Undergraduate students cannot use the spinner without the supervision of a member of staff.

Cleaning up after working

- It is the responsibility of the lecturer in charge of a class to ensure that the students have tidied up the work area after class.

7.0 CERTIFICATION

Lecturer_____

I hereby acknowledge that I have read and understand the following:

1. Institute of Technology Tallaght, Microelectronics Laboratory Safety Manual
2. Microelectronics Cleanroom Policies & Procedures
3. Cleanroom Emergency Exits
4. Cleanroom Gowning Procedure.

Name
(Please Print) Student No. Signature Date
Initials

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Cleanroom users must sign this form and have their lecturer initial beside their name before being allowed access to the cleanroom. This form will be kept on file.

5.2 Energy Control Laboratory (17A - temporarily redesignated as Nines Lab) Inventory Summary

Item	Manufacturer	Model	Quantity
Power Supply Unit	Unknown	01-100	22
Multimeter	Thurlby Thandar	1604	1
Precision LCR Meter	Unknown	45248A	1
USB to GPIB	National Instruments	82357A	1
Computer (PC)	Dell Computers	GX280	1
Computer (PC)	Dell Computers	GX620	1
PSU	Thurlby Thandar	PL303QMD	1
Wind Turbine Grid Connect	Proven	Proven 11	1
Wind Turbine Inverter	SMA	Windyboy	1

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	GX150	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	GX260	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.Check for power cable d	1	2	2	1	2
Elec-219-John Byrne	TG1010GP	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	PL330P	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2		

Risk Assesments for Lab 017A TU Dublin - Tallaght 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	GX150	Electrical (high current).	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	3	3	0	0
Elec-219-John Byrne	GX260	Electrical (high current).	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	3	3	0	0
Elec-219-John Byrne	1705GP	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified not to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	2	4	2	1	2
Elec-218-Damian Cahill	GX280	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2
Elec-209-Damian Cahill	GX620	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2
Elec-215-David Maguire	1604	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2

Risk Assesments for Lab 017A TU Dublin - Tallaght 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-017-Paul Tierney	01-100	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	None	1	2	2	1	2
Elec-017-Paul Tierney	33-100	None	None	None	0	0	0	0	0
Elec-017-Paul Tierney	33-110	None	None	None	0	0	0	0	0
Elec-017-Paul Tierney	33-120	None	None	None	0	0	0	0	0
Elec-017-Paul Tierney	45248A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-017-Paul Tierney	82357A	None	None	None	0	0	0	0	0
Elec-017-Paul Tierney	91000-45	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-017-Paul Tierney	TDS210	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-17A-Paul Tierney	KW6	Falling heavy objects.	20 metre cordon must be setup prior to maintenance work by authorised personnel. Unit is surrounded by a security fence.	Standard Operating Procedure defined in respect of maintenance.	2	6	3	1	3
Elec-17A-Paul Tierney	KW6	Electrical - 3-phase power	Switch-off isolators at both the turbine and main power feed in lab17A.	Standard Operating Procedure defined in respect of maintenance.	2	6	3	1	3

Risk Assesments for Lab 017A TU Dublin - Tallaght 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-17A-Paul Tierney	KW6	Mechanical - high speed moving parts	20 metre cordon must be setup prior to maintenance work by authorised personnel. Unit is surrounded by a security fence.	Standard Operating Procedure defined in respect of maintenance.	2	6	3	1	3
Elec-17A-Paul Tierney	PL303QMD	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB. Unit rack-mounted and not accessible to students.	None	1	2	2	1	2
Elec-17A-Paul Tierney	Proven 11	Electrical - high current	Qualified personnel ONLY permitted access to equipment. Isolator interlock power protection.	Unit is housed in a lockable storage unit.	2	6	3	1	3
Elec-17A-Paul Tierney	TDS2012C	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-17A-Paul Tierney	Windyboy	Electrical - 3-phase power	Switch-off isolators at both the turbine and main power feed in lab17A.	Standard Operating Procedure defined in respect of maintenance.	2	6	3	1	3

STANDARD OPERATING PROCEDURE

Organisation:	TU Dublin - Tallaght
Section:	**School of Engineering**
Procedure Name:	**Code of Conduct for Engineering Laboratory 017A (Control Systems Lab)**
Procedure No:	**E2077**
Revision:	**A**
Prepared By:	**Paul Tierney**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	Paul Tierney Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory 017A , that all users must comply with the following lab specific Standard Operating Procedures.

E2085 SOP for Wind Turbine Maintenance

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.3 Computer Laboratory (Lab 208) Inventory Summary

Item	Manufacturer	Model	Quantity
Computer (PC)	Dell	Optiplex 7010	23

Risk Assessments for Lab 208 TU Dublin - Tallaght 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	Ultra20	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2

STANDARD OPERATING PROCEDURE

Organisation: **TU Dublin - Tallaght**

Section: **School of Engineering**

Procedure Name:	**Code of Conduct for Engineering Laboratory 208**
Procedure No:	**E2073**
Revision:	**A**
Prepared By:	**Damien Cahill**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	D Cahill Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory *Lab208*, that all users must comply with the following lab specific Standard Operating Procedures.

None

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.4 Computer Laboratory (Lab 209) Inventory Summary (Active Items)

Item	Manufacturer	Model	Quantity
Computer (PC)	Dell	Optiplex 790	40

Equipment Risk Assessment Lab 209 TU Dublin - Tallaght 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-209-Damian Cahill	GX620	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2
Elec-209-Damian Cahill	Optiplex 790	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	None	1	2	2	1	2

STANDARD OPERATING PROCEDURE

Organisation: **TU Dublin - Tallaght**

Section: **School of Engineering**

Procedure Name:	**Code of Conduct for Engineering Laboratory 209**
Procedure No:	**E2074**
Revision:	**A**
Prepared By:	**Damien Cahill**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	D Cahill Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory *Lab209*, that all users must comply with the following lab specific Standard Operating Procedures.

None

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.5 Computer Laboratory (Lab 212) Inventory Summary

Item	Manufacturer	Model	Quantity
Computer (PC)	Hewlett Packard	Hp Compaq 6005 Pro	46

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-212-Derek Troute	SunBlade 1500	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2
Elec-218-Damian Cahill	Hp Compaq 6005 Pro	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2

STANDARD OPERATING PROCEDURE

Organisation:	**TU Dublin - Tallaght**
Section:	**School of Engineering**

Procedure Name:	**Code of Conduct for Engineering Laboratory 212**
Procedure No:	**E2075**
Revision:	**A**
Prepared By:	**Damien Cahill**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	D Cahill Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory *Lab212*, that all users must comply with the following lab specific Standard Operating Procedures.

None

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.6 Digital Systems Laboratory (Lab 215) Inventory Summary

Item	Manufacturer	Model	Quantity
Power Supply Unit	Topward	1300	5
Multimeter	Thurlby Thandar	1604	19
Logic Analyser	Hewlett Packard	1663A	5
Eprom Programmer	Data IO	2900	1
Multimeter	Thurlby Thandar	7210	6
Function Generator	Topward	8105	4
Emulator	Ashling	CTS51	4
Power Supply Unit	Hewlett Packard	E3610A	23
Computer (Laptop)	Fujitsu-Siemens	EsprimoV5535	8
Computer (PC)	Hewlett Packard	Hp Compaq 6005 Pro	25
Oscilloscope	Agilent	HP54600A	1
Power Supply Unit	Thurlby Thandar	PL320QMT	19
Oscilloscope	Tektronix	TDS2012B	25
Oscilloscope	Tektronix	TDS2012C	1
Function Generator	Thurlby Thandar	TG210	20
Spectrum Analyser Adapter	Thurlby Thandar	TSA250	3

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	GX150	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	PL320QMT	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.Check for power cable d	1	2	2		
Elec-219-John Byrne	GX150	Electrical (high current).	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	3	3	0	0
Elec-219-John Byrne	EsprimoV5535	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2

Equipment Risk Assessments Lab 215 TU Dublin - Tallaght

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-218-Damian Cahill	Hp Compaq 6005 Pro	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2
Elec-215-David Maguire	1300	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2
Elec-215-David Maguire	1604	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2
Elec-215-David Maguire	2900	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	None	1	2	2	1	2
Elec-215-David Maguire	3225MP	None	None	None	0	0	0	0	0
Elec-215-David Maguire	7210	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2

Equipment Risk Assessments Lab 215 TU Dublin - Tallaght

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-215-David Maguire	8105	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-217-David Maguire	HP54600A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-219-John Byrne	TDS2012B	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-215-David Maguire	TG210	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-215-David Maguire	TSA250	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2

Equipment Risk Assessments Lab 215 TU Dublin - Tallaght

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-215-David Maguire	AX502	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	None	1	2	2	1	2
Elec-215-David Maguire	CTS51	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-215-David Maguire	E3610A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2

STANDARD OPERATING PROCEDURE

Organisation:	**TU Dublin - TALLAGHT**
Section:	**School of Engineering**
Procedure Name:	**Code of Conduct for Engineering Laboratory 215 (Digital Systems Lab)**
Procedure No:	**E2071**
Revision:	**A**
Prepared By:	**David Maguire**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	David Maguire Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory *Lab215*, that all users must comply with the following lab specific Standard Operating Procedures.

None

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.7 Analogue Systems Laboratory (Lab 217) Inventory Summary (Active Items)

Item	Manufacturer	Model	Quantity
Power Supply Unit	Unknown	01-100	1
Power Supply Unit	Topward	1300	2
Multimeter	Thurlby Thandar	1604	25
Multimeter	Agilent	1705GP	12
Soldering Station	Ungar	2110K	7
DC Servo Rig	Unknown	33-100	12
Analogue Units	Bytronic	33-110	12
Digital Units	Bytronic	33-120	12
Protocol Analyser	Hewlett Packard	4954A	1
Oscilloscope	Hewlett Packard	54501A	2
Microprocessor Development System	Hewlett Packard	64700	1
Function Generator	Topward	8105	2
CBT Board (Transducers)	Lab-Volt	91019-20B	12
CBT Board (Motors)	Lab-Volt	91024-20	12
8051 8 Channel ADC	Bytronic	BYT8051ADC	3
8051 Development Board	Bytronic	BYT8051DEVBRD	25
8051 Output Driver	Bytronic	BYT8051OPDRV	5
8051 Port Monitor	Bytronic	BYT8051PRTMT	5
8051 Screw Terminal	Bytronic	BYT8051SCRTR	5
8051 Target Board	Bytronic	BYT8051TRBRD	5
Pendulum Control System	Bytronic	BYTPCS017	1
Midi PLC Mounting frame	Bytronic	BYTPLC017	12
Rotary Transfer Unit	Bytronic	BYTRTU017	5
Single Conveyor Unit	Bytronic	BYTSCU017	5
Traffic Control Unit	Bytronic	BYTTCU017	12
Power Supply Unit	Hewlett Packard	E3610A	19
Computer (PC)	Hewlett Packard	Hp Compaq 6005 Pro	20
Power Supply Unit	Thurlby Thandar	PL320QMT	25

Item	Manufacturer	Model	Quantity
Oscilloscope	Tektronix	TDS210	12
Oscilloscope	Tektronix	TDS220	20
Function Generator	Tektronix	TG1010GP	12
Function Generator	Thurlby Thandar	TG210	25

Equipment Risk Assessment Lab 217 TU Dublin - Tallaght

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	PL320QMT	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to perform servicing. Remove power before attempting service. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.	1	2	2		
Elec-218-Damian Cahill	Hp Compaq 6005	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2
Elec-217-David Maguire	1663A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-215-David Maguire	1300	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2
Elec-215-David Maguire	1604	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2
Elec-215-David Maguire	2110K	Burn - hot surface	Students are notified of hazard at lab inductions and given training in the proper use of the item.	None	2	2	1	2	2
Elec-215-David Maguire	2110K	Burn - fire hazard due to hot surface.	Students are notified of hazard at lab inductions and given training in the proper use of the item.	Item to be used only with supplied appropriate holder-unit.	2	4	2	1	2

Equipment Risk Assessment Lab 217 TU Dublin - Tallaght

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-215-David Maguire	3225MP	None	None	None	0	0	0	0	0
Elec-215-David Maguire	4954A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-215-David Maguire	54501A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-215-David Maguire	64700	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-215-David Maguire	8105	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-215-David Maguire	TG210	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-215-David Maguire	E3610A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2

Equipment Risk Assessment Lab 217 TU Dublin - Tallaght

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-217-David Maguire	OX800	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-217-David Maguire	V-552	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2

STANDARD OPERATING PROCEDURE

Organisation:	**TU Dublin - Tallaght**
Section:	**School of Engineering**
Procedure Name:	**Code of Conduct for Engineering Laboratory 217 (Analogue and Control Systems Lab)**
Procedure No:	**E2072**
Revision:	**A**
Prepared By:	**David Maguire**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	D Maguire Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory *Lab217*, that all users must comply with the following lab specific Standard Operating Procedures.

None

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.8 Computer Laboratory (Lab 218) Inventory Summary

Item	Manufacturer	Model	Quantity
Computer (PC)	Hewlett Packard	Hp Compaq 6005 Pro	1
Computer (PC)	Dell	Optiplex 5040	30

Equipment Risk Assessment Lab 218 TU-Dublin - Tallaght 12/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-218-Damian Cahill	GX280	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2
Elec-218-Damian Cahill	Hp Compaq 6005	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct	1	2	2	1	2
Elec-218-Damien Cahill	Optiplex 5040	Electrical - 240v mains power exposure if main covers	Cases are locked with a key lock	Cases are locked with a key lock	1	2	2	1	2

STANDARD OPERATING PROCEDURE

Organisation: **TU Dublin - Tallaght**

Section: **School of Engineering**

Procedure Name:	**Code of Conduct for Engineering Laboratory 218**
Procedure No:	**E2076**
Revision:	**A**
Prepared By:	**Damien Cahill**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	D Cahill Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory *Lab218*, that all users must comply with the following lab specific Standard Operating Procedures.

None

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

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7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.9 Communications Systems Laboratory (Lab 219) Inventory Summary

Item	Manufacturer	Model	Quantity
Multimeter	Agilent	1705GP	18
Network Router	Cisco	2514	2
Arbitrary Function Generator	Agilent	33120A	2
Interactive Whiteboard	Hitachi	4256	1
IP Phone	Cisco	7905	3
FET Probe	Philips	8943A	2
Vector Signal Analyser	Agilent	89441A	1
CBT Board (Analog Comms)	Lab-Volt	91018	10
CBT Board (Digital Comms 1)	Lab-Volt	91022	13
CBT Board (Digital Comms 2)	Lab-Volt	91023	12
CBT Board (DSP Trainer)	Lab-Volt	91027-20	1
Telephony Trainer	Lab-Volt	92594	1
Microwave Trainer	Lab-Volt	9500	1
Wireless Access Point	Cisco	AIR-AP1131AG-E-K9	1
802.11 a/g Network Radio	Cisco	AIR-AP1232AG-E-K9	1
Wireless Access Point	Cisco	AIR-BR1310G-E-K9	2
PCMIA Wireless Adapter	Cisco	AIR-C821AG-E-K9	10
CBT Base Unit	Lab-Volt	AS9100-45	28
Antenna Trainer	Feedback	ASD512	1
Analogue telephone adapter	Cisco	ATA187	3
Network Router	Cisco	CISCO2801	21
Network Router	Cisco	CISCO2811	2
Digital Audio Processor (5-Band)	Cte Broadcast	Condor50	1
Codification Digital RDS	Cte Broadcast	CR102	1
Soldering Station	Weller	DS801	2
Network Cable Analyser	Fluke	DTX1200	1
Signal Generator	Agilent	E4432B	1
Overhead Projector	Mitsubishi	EX240U	1

Item	Manufacturer	Model	Quantity
Spectrum Analyser	Hewlett Packard	HP4195A	1
Power Meter	Hewlett Packard	HP437B	1
Spectrum Analyser	Hewlett Packard	HP8594E	1
Internet Advisor	Agilent	J2300D	1
Power Meter	Anritsu	ML2438A	1
uWave Frequency Counter	Anritsu	MF2412B	1
Analogue Telephone	Interquartz	MPH0	3
Spectrum Analyser	Anritsu	MS2651B	4
Network Analyser	Anritsu	MS4622B	1
Microstrip Trainer	Feedback	MST532	1
Power Supply Unit	Thurlby Thandar	PL320QMT	24
Computer (Laptop)	Dell Computers	PP22X	10
Data Acqusition Module	National Instruments	Speedy33	20
Oscilloscope	Tektronix	TDS2012B	20
Oscilloscope	Tektronix	TDS220	10
Function Generator	Tektronix	TG1010GP	27
Function Generator	Thurlby Thandar	TGP1040	1
RF Transmitter	Cte Broadcast	TX250 Plus	1
Data Acquisition Module	National Instruments	USB65U	1
Network Switch	Cisco	WS-C1912-EN	2
Network Switch	Cisco	WS-C1924-A	2
Network Switch	Cisco	WS-C2960-24TT-L	30
Computer (PC)	Dell	Optiplex 7010	21
Real-Time Spectrum Analyser	Tektronix	RSA306	1
Network Router (Sec)	Cisco	Cisco2901-SECK9	2
Network Router	Cisco	Cisco2901	22
Network Switch	Cisco	Catalyst 2960	24
Advanced Security Appliance (ASA)	Cisco	ASA5505	1

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	ASD512	RF Power (RF or uwave energy irradiation). Coils may cause blood-clots in any extremities placed within the core-space of the coil.	Lecturers notified that item is not to be used unsupervised. SOP specified and available in location of use.	Avoid placing extremities within the coil antenna. Unqualified users must be supervised. Report problems to IT Tallaght technical support staff.Communicate precautions to users.	2	4	2	1	2
Elec-219-John Byrne	ASD512	Chemical (toxic substance). Power-meter internal transistors contain beryllium and pose a toxic threat if damaged.	None.	Avoid use of system if damaged. Report any damage or shock (e.g. fall) caused to the instrument to relevant IT Tallaght staff. When not in use store the instrument to avoid casual use or misuse. Unqualified users must be supervised.	2	6	3	1	3
Elec-219-John Byrne	ASD512	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	33120A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified not to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	AS9100-45	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	GX150	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	GX260	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.Check for power cable d	1	2	2	1	2

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	TG1010GP	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	J2300D	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.Check for power cable d	1	2	2	1	2
Elec-219-John Byrne	MST532	None	None		0	0	0		
Elec-219-John Byrne	9500	Electrical (240v mains power)	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	2	2	1		
Elec-219-John Byrne	91018	None	None	None	0	0	0		

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	MS4622B	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2		
Elec-219-John Byrne	MST532	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.Check for power cable d	1	2	2	1	2
Elec-219-John Byrne	2514	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified not to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB. Routers are mounted within racks.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2
Elec-219-John Byrne	WS-C1912-EN	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Rack-mounted unit.	1	2	2	1	2

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	WS-C1924-A	Electrical (240v mains power)	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Rack-mounted unit.	1	2	2	1	2
Elec-219-John Byrne	TDS220	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	TDS3052	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2		

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	TDS3054	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	HP437B	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	PL320QMT	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.Check for power cable d	1	2	2		

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	E4432B	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	HP4195A	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	1	1		
Elec-219-John Byrne	HP8594E	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	MS2651B	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	92594	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.Communicate precautions	1	2	2		
Elec-219-John Byrne	MF2412B	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	2	4	2		
Elec-219-John Byrne	89441A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified not to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-219-John Byrne	91022	None	None	None	0	0	0		

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	91023	None	None	None	0	0	0		
Elec-219-John Byrne	DS801	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2		
Elec-219-John Byrne	DS801	Burn (hot surface).	None	Handle instrument with caution. Store iron in the receptacle provided when in use and when not in use. Do not leave the instrument unattended and switched-on. Avoid placing flammable materials or substances in the vicinity of the iron. Advise co-use	2	2	1	2	2
Elec-219-John Byrne	HP4195A	Mechanical (heavy equipment).	Instrument positioned on a suitable trolley.	Instrument must remain on a suitable trolley for normal use. Users attempting to remove the instrument from the trolley must have completed a manual handling course. Single user lifting of instrument not possible and is prohibited.	2	2	1	0	0
Elec-219-John Byrne	HP8594E	Mechanical (heavy equipment).	Instrument positioned on a suitable trolley.	Instrument must remain on a suitable trolley for normal use. Users attempting to remove the instrument from the trolley must have completed a manual handling course. Single user lifting of instrument not possible and is prohibited.	1	3	3	0	0

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	GX150	Electrical (high current).	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	3	3	0	0
Elec-219-John Byrne	GX260	Electrical (high current).	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	3	3	0	0
Elec-219-John Byrne	8943A	None	None	None	0	0	0	0	0
Elec-219-John Byrne	1705GP	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified not to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	2	4	2	1	2
Elec-221-John Byrne	2501	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified not to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB. Routers are mounted within racks.	Regular inspection of mains cables and testing of MCB. Safety information in student handbooks.	1	2	2	1	2

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-221-John Byrne	WS-C2960-24TT-L	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks. Rack-mounted unit.	1	2	2	1	2
Elec-219-John Byrne	CISCO2801	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	2	4	2	1	2
Elec-219-John Byrne	Ultra20	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-219-John Byrne	TX250 Plus	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	2	4	2	1	2
Elec-219-John Byrne	TX250 Plus	RF Power - Potentially high levels of RF radiation. Possible exposure if powered without being connected to a load (dummy or real).	Students are not permitted to operate this item un-supervised. Dummy load connected by default.	Item is housed in a contained racking system. Key required to open rack and to power-up the item. Key is held by nominated technical staff (John Byrne or David Maguire).	2	4	2	1	2

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	Condor50	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	2	4	2	1	2
Elec-219-John Byrne	CR102	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2
Elec-219-John Byrne	89441A	Mechanical - heavy equipment	Notification placed on item advising the use of a trolly if item is to be moved and against single-person lift attempts.	None	1	1	1	1	1
Elec-219-John Byrne	LC4331	Chemical - toxic substance	Bulb contained within system casing and is not readily accessible.	Technical staff only permitted to service item.	1	2	2	1	2
Elec-219-John Byrne	ML2438A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2
Elec-219-John Byrne	4256	None	None	None	0	0	0	0	0
Elec-219-John Byrne	AIR-AP1131AG-E-K9	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	AIR-AP1232AG-E-K9	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-219-John Byrne	AIR-BR1310G-E-K9	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-219-John Byrne	AIR-C821AG-E-K9	None	None	None	0	0	0	0	0
Elec-219-John Byrne	CISCO2811	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB. Unit rack-mounted and not accessible to students.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-219-John Byrne	CR102	RF Power - RF or microwave energy irradiation. Disconnection of main signal feed cable presents burn hazard.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Unit is housed in a lockable storage unit. Authorised staff use only permitted.	2	4	2	1	2
Elec-219-John Byrne	DTX1200	None	None	None	0	0	0	0	0
Elec-219-John Byrne	PP22X	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	Speedy33	None	None	None	0	0	0	0	0
Elec-219-John Byrne	TDS2012B	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-219-John Byrne	TGP1040	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-219-John Byrne	USB65U	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-219-John Byrne	7905	None	None	None	0	0	0	0	0
Elec-219-John Byrne	91027-20	None	None	None	0	0	0	0	0
Elec-219-John Byrne	ATA187	None	None	None	0	0	0	0	0
Elec-219-John Byrne	MPH0	None	None	None	0	0	0	0	0
Elec-219-John Byrne	EX240U	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	None	1	2	2	1	2

Equipment Risk Assessments Lab 219 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	Optiplex 7010	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	None	1	2	2	1	2
Elec-219-John Byrne	Cisco2901-SECK9	Electrical - 240v mains power exposure if main covers removed.	Advisory issued to Staff and Students: Only authorised personnel to service device.	Equipment is secured in 19" racking with security bolts and must be physically removed before covers cans be removed.	1	2	2	2	4
Elec-219-John Byrne	Cisco2901	Electrical - 240v mains power exposure if main covers removed.	Advisory issued to Staff and Students: Only authorised personnel to service device.	Equipment is secured in 19" racking with security bolts and must be physically removed before covers cans be removed.	1	2	2	2	4
Elec-219-John Byrne	Catalyst 2960	Electrical - 240v mains power exposure if main covers removed.	Advisory issued to Staff and Students: Only authorised personnel to service device.	Equipment is secured in 19" racking with security bolts and must be physically removed before covers cans be removed.	1	2	2	2	4
Elec-219-John Byrne	ASA5505	Electrical - 240v mains power exposure if main covers removed.	Advisory issued to Staff and Students: Only authorised personnel to service device.	Equipment is secured in 19" racking with security bolts and must be physically removed before covers cans be removed.	1	2	2	2	4

STANDARD OPERATING PROCEDURE

Organisation:	**TU Dublin - Tallaght**
Section:	**School of Engineering**
Procedure Name:	**Code of Conduct for Engineering Laboratory 219 (Communications Systems Laboratory)**
Procedure No:	**E2068**
Revision:	**A**
Prepared By:	**John Byrne**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	John Byrne Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory *Lab219*, that all users must comply with the following lab specific Standard Operating Procedures.

Use of the Antenna Trainer (SOP Ref: E2086) Use of Radio Transmitter (SOP Ref: E2087)

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

STANDARD OPERATING PROCEDURE

Organisation:	**TU Dublin - Tallaght**
Section:	**School of Engineering**
Procedure Name:	**Use of the Antenna Trainer in Lab219 (Communications Systems Laboratory)**
Procedure No:	**E2086**
Revision:	**A**
Prepared By:	**John Byrne**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	John Byrne Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff potential risks associated with the normal use of the Antenna Trainer (model: ASD512) located in lab219 (Communications Systems Laboratory) and the precautions and controls to be employed.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 The antenna platform is to be removed and returned by two persons.

6.2 The antenna platform is secured to the chassis by two guide pins and clasps. To remove the platform undo the clasps and withdraw the platform from the chassis. To return the platform, use the guide pins to ensure alignment of the platform to the chassis and then secure the clasps in place.

6.3 Chemical (toxic substance). The antenna's power-meter internal transistors contain beryllium and pose a toxic threat if damaged. User must first inspect the trainer and its components for any damage prior to use amd must refrain from use of the trainer if damaged. Report any damage or shock (e.g. fall) caused to the instrument to technical support staff. Unqualified users must be supervised when using this trainer.

6.4 The trainer operates at moderate RF power ratings. Antenna coils may cause blood-clots in any extremities placed within the core-space of the coils when operational. All users must be advised of this hazard and must not use the trainer inappropriately.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001.*

STANDARD OPERATING PROCEDURE

Organisation:	**INSTITUTE OF TECHNOLOGY TALLAGHT**
Section:	**School of Engineering**
Procedure Name:	**Use of the Antenna Trainer in Lab219 (Communications Systems Laboratory)**
Procedure No:	**E2086**
Revision:	**A**
Prepared By:	**John Byrne**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	John Byrne Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff potential risks associated with the normal use of the Antenna Trainer (model: ASD512) located in lab219 (Communications Systems Laboratory) and the precautions and controls to be employed.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 The antenna platform is to be removed and returned by two persons.

6.2 The antenna platform is secured to the chassis by two guide pins and clasps. To remove the platform undo the clasps and withdraw the platform from the chassis. To return the platform, use the guide pins to ensure alignment of the platform to the chassis and then secure the clasps in place.

6.3 Chemical (toxic substance). The antenna's power-meter internal transistors contain beryllium and pose a toxic threat if damaged. User must first inspect the trainer and its components for any damage prior to use amd must refrain from use of the trainer if damaged. Report any damage or shock (e.g. fall) caused to the instrument to technical support staff. Unqualified users must be supervised when using this trainer.

6.4 The trainer operates at moderate RF power ratings. Antenna coils may cause blood-clots in any extremities placed within the core-space of the coils when operational. All users must be advised of this hazard and must not use the trainer inappropriately.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001.*

STANDARD OPERATING PROCEDURE

Organisation:	**INSTITUTE OF TECHNOLOGY TALLAGHT**
Section:	**School of Engineering**
Procedure Name:	**Use of Radio Transmitter (Condor 50) in Lab219 (Communications Systems Laboratory)**
Procedure No:	**E2087**
Revision:	**A**
Prepared By:	**John Byrne/David Maguire**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	David Maguire and John Byrne Sept 2010	J.Wright	

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff potential risks associated with the normal use of the Antenna Trainer (model: ASD512) located in lab219 (Communications Systems Laboratory) and the precautions and controls to be employed.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Read Instructions. If in any doubt regarding the proper use of this device, ASK. All safety/operating instructions must be read before operating the transmitter. The user manual is available from electronic engineering technical support staff.

6.2 Heed All Warnings.
All warnings on the product and those listed in the operating instructions must be adhered to.

6.3 Heat.
This product must be situated away from any heat sources such as radiators or other products (including power amplifiers or transmitters) that produce heat.

6.4 Power Sources.
This product must be operated from the type of power source indicated on the marking label and in the installation instructions. If you are not sure of the type of power supplied to your facility, consult the department of electronic engineering technical support staff. Do not switch on power before all cables have been properly attached.

6.5 Power Cord Protection.
Power supply cords must be routed so that they are not likely to be walked on nor pinched by items placed upon or against them. Pay particular attention to the cords at AC wall plugs and convenience receptacles, and at the point where the cord plugs into the product.

6.6 Lightning.
For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the AC wall outlet, the audio connections and the Mpx connection. This will prevent damage to the product due to lightning and power line surges.

6.7 Installation.
The installation must be carried out by qualified technicians.

6.8 Cabling.
Use of high quality, protected cables and balanced connections is recommended. Ensure cable integrity prior to use. If possible, use digital audio link (through the optional Digital Input plug-in).

6.9 When finished using the transmitter, power down the unit, disconnect and return all cables and accessories to their proper storage areas. Close and lock transmitter housing chassis.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001.*

STANDARD OPERATING PROCEDURE

Organisation:	**INSTITUTE OF TECHNOLOGY TALLAGHT**
Section:	**School of Engineering**
Procedure Name:	**Fibre Optic Cleaver**
Procedure No:	**E2094**
Revision:	**A**
Prepared By:	**David Maguire**
Date:	**March 2017**
Approved By:	
Date:	

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	D Maguire March 2017		

1.0 POLICY

The School of Engineering provides and maintains the Proven 6000 Wind Turbine for the purpose of supporting courses run by the School. In order to ensure a safe, working environment during the maintenance / repair of the Wind turbine, all authorised technical staff are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper practice when carrying out maintenance or repair on the Wind Turbine.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 **Always wear Facemask, Gloves and Safety Glasses**

6.2 Always work in a clean and tidy area

6.3 **Pour the Retaining Compound into the Syringe**

6.4 **Prepare the cable with a LC connector**

6.5 **Mark the cable approx 35mm**

6.6 **Mark the cable at 16mm from the top**

6.7 **Remove 900 micron Buffer using the Fibre Optic Stripper**

6.8 **Remove Primary Buffer coating**

6.9 **Clean the exposed fiber with a wet or alcohol wipe**

6.10 **Cut exposed aramid strength yarns (Kevlar) to 6mm**

6.11 **Dispose of yarns into Fibre Disposal Unit**

6.12 Insert the fiber into the Fitel S325 Precision Cleaver

6.13 Strip the fiber so that 14 to 25mm is exposed passed your aimed cleave length. Allows the automatic fiber waste disposal feature to work

6.14 In case of 16mm cleave length, remove the coating more than 30mm(=16+14), and less than 41mm(=16+25)

6.15 **Inject the adhesive into the connector** body using a syringe and a blunt hypodermic needle, until a small bead appears at the end of the ferrule

6.16 After using the hypodermic needle, carefully dispose of it into the Sharps Bin located in the Lab.

6.17 After the activity is completed the Sharps Bin is brought to the Department of Science for disposal of the hypodermic needle.

6.18 Follow the "Cold Cure Termination User Manual" to complete the attachment of the Fibre Connector.

6.19 The final three stages cover the Cleaving, Polishing and Testing of the Fibre Connector – as per the "Cold Cure Termination User Manual".

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.10 Projects Laboratory (Lab 221) Inventory Summary

Item	Manufacturer	Model	Quantity
Multimeter	Agilent	1705GP	15
Curve Tracer	Tektronix	571	1
Optical Test Set	Agilent	MT9810A	1
Computer (PC)	Dell Computers	Optiplex 745	20
Power Supply Unit	Thurlby Thandar	PL320QMT	19
Power Supply Unit	Thurlby Thandar	PL330P	2
Logic Analyser	Tektronix	PRISM3002	1
Synthesised Signal Generator	Hewlett Packard	PSG1000	1
Data Acqusition Module	National Instruments	Speedy33	2
Oscilloscope	Tektronix	TDS220	15
Oscilloscope	Tektronix	TDS3052	2
Oscilloscope	Tektronix	TDS3054	1
Function Generator	Tektronix	TG1010GP	15
Computer (PC)	Dell	Optiplex 5040	17

Equipment Risk Assessments Lab 221 TU Dublin - Tallaght

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	GX260	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.	1	2	2	1	2
Elec-219-John Byrne	TG1010GP	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-221-John Byrne	571	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified not to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications.MCB circuits used in Lab.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	2	4	2	1	2
Elec-219-John Byrne	TDS220	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2	1	2
Elec-219-John Byrne	PL320QMT	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits.Check for power cable d	1	2	2		

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-221-John Byrne	PSG1000	Electrical (240v mains power)	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	2	4	2		
Elec-219-John Byrne	MT9810A	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2		
Elec-219-John Byrne	PL330P	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	2	2		
Elec-219-John Byrne	MT9810A	Physical (laser source).	Safety label positioned upon the instrument.	Proper safety markings are appropriately positioned on the instrument and are clearly visible. Communicate precautions to users.	1	2	2		
Elec-219-John Byrne	GX260	Electrical (high current).	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	1	3	3	0	0

Equipment Risk Assessments Lab 221 TU Dublin - Tallaght

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	571	Electrical - 240v mains power exposure if main covers removed.	Students are informed (student manual) not to remove equipment covers or to attempt repairs. MCB-protected circuits used in labs.	Qualified IT-Tallaght personnel or appointed agents only, to remove covers and perform servicing. Remove power before attempting service of PSU. PSU repairs must not be performed unaccompanied. Use MCB-protected power circuits. Check for power cable	2	4	2		
Elec-221-John Byrne	PRISM3002	Electrical - 240v mains power exposure if main covers removed.	None	None	1	2	2	1	2
Elec-219-John Byrne	1705GP	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified not to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	2	4	2	1	2
Elec-221-John Byrne	Optiplex 745	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2
Elec-219-John Byrne	Speedy33	None	None	None	0	0	0	0	0
Elec-218-Damien Cahill	Optiplex 5040	Electrical - 240v mains power exposure if main covers removed.	Cases are locked with a key lock	Cases are locked with a key lock	1	2	2	1	2

STANDARD OPERATING PROCEDURE

Organisation:	**TU Dublin - Tallaght**
Section:	**School of Engineering**
Procedure Name:	**Code of Conduct for Engineering Laboratory 221 (Degree Project Lab)**
Procedure No:	**E2069**
Revision:	**A**
Prepared By:	**John Byrne**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	J.Byrne Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory *Lab221*, that all users must comply with the following lab specific Standard Operating Procedures.

None

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.11 Anechoic Chamber (AEC) Laboratory Inventory Summary (Active Items)

Item	Manufacturer	Model	Quantity
RF Shielded Chamber	Emerson and Cumming	Eccoshield	1

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-AEC-John Byrne	Eccoshield	Mechanical - locking mechanisms.	Secure lock disabled.	Standard Operating Procedure defined in respect of chamber use (ref E2093).	1	1	1	1	1
Elec-AEC-John Byrne	Eccoshield	Burn - Noxious gas emitted on combustion of absorbent cones.	Fire-alarm system installed. Standard Operating Procedure defined in respect of chamber use (ref E2093).	Replacement of absorbent cones/material.	1	2	2	1	2

STANDARD OPERATING PROCEDURE

Organisation: **TU Dublin - Tallaght**

Section: **School of Engineering**

Procedure Name:	**Code of Conduct for Anechoic Chamber**
Procedure No:	**E2093**
Revision:	**A**
Prepared By:	**John Byrne**
Date:	**June 2013**
Approved By:	
Date:	**10/06/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	John Byrne Sept 2013		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents, equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised IT Tallaght (ITTD) staff to ensure best and safe practice within the laboratory environment.

6.15 Users are not permitted to effect repairs or modifications to ITTD laboratory equipment. Only ITTD Technical support staff and/or ITTD authorised agents are permitted to effect equipment repairs and/or modifications.

6.16 It is a condition of use of laboratory *Anechoic Chamber* that users must notify the Technical Officers responsible for the chamber of their intention to use the chamber and to specify the period of use. This notification is in the form of a booking (see http://engineering.it-tallaght.ie/) which is a required pre-requisite to the use of the Anechoic Chamber. In the absence of a booking, a user is not authorised to use the chamber.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.12 Field Laboratory Inventory Summary (Active Items)

Item	Manufacturer	Model	Quantity
Wind Turbine	Proven	KW6	1
Met Mast	Proven	Met1	1

Equipment Risk Assessments Lab Field 11/09/2019

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR	S
Elec-Fld-David Maguire	KW6	Mechanical - high speed moving parts (rotars)	Palisade fencing incorporating a double gate, which is currently damaged.	Fencing repair and both access gates are locked, allowing authoirsed staff only to enter	2	6	3	1	3	3
Elec-Fld-John Fox	Met1	Physical - tripping hazard due to anchor points and guide wires.	Low-height wooden perimeter fence.	None	2	4	2	2	4	2
Elec-Fld-John Fox	Met1	Electrical - 240v mains power exposure if main covers removed.	IP rated container	None	1	2	2	1	2	2

5.13 Radio Frequency Technology Laboratory (RFT) Inventory Summary (Active Items)

Item	Manufacturer	Model	Quantity
Active Probe	Agilent	1156A	1
Arbitrary Function Generator	Agilent	33120A	1
Calibration Kit	Agilent	8502D	1
Test Port Cable	Agilent	85131D	2
Oscilloscope	Agilent	DSO8104A	1
Wireless Test-Set	Agilent	N4010A	1
Vector Signal Generator	Agilent	N5182A	1
Microwave Analyser (PNA)	Agilent	N5230A	1
Power System Mainframe	Agilent	N6700B	1
Precision 50W DC Power Supply	Agilent	N6761A	1
Vector Signal Analyser	Agilent	N9020A	1
Power Supply Unit	Thurlby Thandar	PL320QMT	1
Computer (Workstation)	Dell Computers	Precision 690	2
Function Generator	Thurlby Thandar	TGR1040	1

Equipment Risk Assessments Lab RFT TU Dublin - Tallaght

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-219-John Byrne	33120A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified not to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Safety information posters in labs and student handbooks.	1	2	2	1	2
Elec-RFT-John Byrne	DSO8104A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	None	1	2	2	2	4
Elec-RFT-John Byrne	1156A	None	None	None	0	0	0	0	0
Elec-RFT-John Byrne	8502D	None	None	None	0	0	0	0	0
Elec-RFT-John Byrne	N5182A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	None	1	2	2	1	2
Elec-RFT-John Byrne	85131D	None	None	None	0	0	0	0	0
Elec-RFT-John Byrne	N4010A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-RFT-John Byrne	N5230A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-RFT-John Byrne	N6700B	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-RFT-John Byrne	N6761A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-RFT-John Byrne	N9020A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-RFT-John Byrne	Precision 690	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2

STANDARD OPERATING PROCEDURE

Organisation:	**TU Dublin - Tallaght**
Section:	**School of Engineering**
Procedure Name:	**Code of Conduct for Engineering Laboratory Radio Technology Transfer (Synergy Centre)**
Procedure No:	**E2090**
Revision:	**A**
Prepared By:	**John Byrne**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	J.Byrne Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory *Radio Technology Transfer (Synergy Centre)*, that all users must comply with the following lab specific Standard Operating Procedures.

None

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

5.14 TDC Electronic/Electrical Inventory Summary (Active Items)

Item	Manufacturer	Model	Quantity
Multi Function Tester	Fluke	1653	1
Monitor (Flatscreen)	Dell	1704FPTt	19
Multimeter	Agilent	1705GP	11
Power Quality Analyzer	Fluke	434	1
Fluke PAT Tester	Fluke	6500	1
True RMS AC/DC Digital Clam Meter	Tenma	72-6185	1
Light lux meter	Tenma	72-6693	2
Dual Display LCR Meter	Tenma	72-960	1
Three Phase Motor	Mez Motoren Belgium	7BA100L04K	8
Single Phase Motor	Mez Motoren Belgium	7JE90L04	3
Tachometer	Tachometer (RE)	8001	4
Function Generator	Topward	8105	1
Three Phase Motor	Siemens	A7096-2AA60	6
Kart	Tony Kart	A943240	1
Soft Start	Telemecanique	ATS01N206QN	50
Speed Drives	Telemecanique	ATV31HU15N4A	50
Megger	AVO	BMM80	1
Single Phase Motor	GEK Electro Motors LTD	BS5000	1
420W DC power Supply	TT1	CPX400S	1
Computer (PC)	Dell	DHM	11
Motor Test Bed	TQ	FH2	6
PLC	Mitsubishi	fx1N-14MR	1
PLC	Mitsubishi	fx1N-24MR	50
PLC Handheld Programmers	Mitsubishi	FX-20P	38
Computer (PC)	Hewlett Packard	Hp Compaq 6005 Pro	20
Oscilloscope	Agilent	HP54600A	24
Light Meter	ISO-TECH	ILM1332A	1
Function Generator	Black Star	Jupiter 2000	47

Item	Manufacturer	Model	Quantity
Kart Stand	Righetti Ridolfi	Kart Stand	1
Digital PSC-Loop Tester	Robin	KMP4120DL	2
Digital RCD (ELCB)Tester	Robin	KMP5406DL	1
Thermistor Relays	Telemecanique	LT3SA00M	1
Hydrogen Fuel Cell	Heliocentris	Nexa1200	1
Laptop	Dell	PP23LA	5
Quad Battery Conditioner	Optimate	PRO4-S	1
Digital Photo/Contact Tachometer	RS	RS163-5348	1
Dahlandert Motor	Elekfrim	SF90L4/8W	2
Battery Charger	Sealey	SMC03	1
Solid Hydrogen Storage System	Ovonics	Solid Hydrogen Storage S	1
Training Carousel	ITT	Training Carousel	8
Trial Bike	GasGas	Trial Bike	1
Laptop	Fujitsu Semins	V5535	7
Safety Relay	Telemecanique	XPSAK371144P	47
40,000 Count Digital Multimeter	TTi	TTi 1604	1
Digital Oscilloscope	Rohde & Schwarz	HM01002	2
Digital Oscilloscope	Tektronic	TBS1052B-EDU	3
Programmable Power Meter	Rohde & Schwarz	HM8115 2-8kW Power Me	1
Function Generator	TT1	TTi TG315	1
Soldering System	Metcal	MFR-PS1100	1
Soldering Station	Weller	WTCP 51	1
Cordless Drill	DeWalt	DCD780	1
DC Controller	All Trax	SMP48400	1

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-218-Damian Cahill	Hp Compaq 6005	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. lab safety information and code of conduct through lab manuals, student handbooks and lab induction sessions.	1	2	2	1	2
Elec-215-David Maguire	8105	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-215-David Maguire	HP3224A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-217-David Maguire	HP54600A	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-215-David Maguire	Jupiter 2000	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Regular inspection of mains cables and testing of MCB. Students informed re. safety information and code of conduct through student handbooks and laboratory induction sessions.	1	2	2	1	2
Elec-TDC-Mark Murphy	LT3SA00M	Electrical - 240V mains power exposure if unit is opened or damaged or wired incorrectl - ELV wires crossed over with LV	Segregation, colour coded and labelled LV & ELV wiring. Components used to recognized standard, terminal layout and instructions in student workbook, Regular inspection.	More notices and documentation to be made available and on display	2	4	2	1	2
Elec-TDC-Mark Murphy	FX-20P	None	None	None	0	0	0	0	0

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-TDC-Mark Murphy	1653	Electrical - improper use may lead to injury.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	3	6	2	2	4
Elec-TDC-Mark Murphy	1704FPTt	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB. Unit rack-mounted and not accessible to students.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-TDC-Mark Murphy	434	Electrical - improper use may lead to injury.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	6	3	1	3
Elec-TDC-Mark Murphy	6500	Electrical - 240v mains power exposure	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-TDC-Mark Murphy	72-6185	Electrical - improper use may lead to injury.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-TDC-Mark Murphy	72-6693	None	None	None	0	0	0	0	0
Elec-TDC-Mark Murphy	72-960	None	None	None	0	0	0	0	0
Elec-TDC-Mark Murphy	7BA100L04K	Electrical - 3-phase power	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	6	3	1	3
Elec-TDC-Mark Murphy	7JE90L04	Electrical - 240v mains power exposure	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	6	3	1	3
Elec-TDC-Mark Murphy	8001	Mechanical - high speed moving parts	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	2	1	1	1
Elec-TDC-Mark Murphy	A7096-2AA60	Electrical - 3-phase power	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-TDC-Mark Murphy	A943240	None	None	None	0	0	0	0	0
Elec-TDC-Mark Murphy	ATS01N206QN	None	None	None	0	0	0	0	0

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-TDC-Mark Murphy	ATV31HU15N4A	Electrical - 3-phase power	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	6	3	1	3
Elec-TDC-Mark Murphy	ATV31HU15N4A	Mechanical - high speed moving parts	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-TDC-Mark Murphy	BMM80	Electrical - improper use may lead to injury.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-TDC-Mark Murphy	BS5000	Mechanical - high speed moving parts	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	4	2	1	2
Elec-TDC-Mark Murphy	CPX400S	Electrical - high current	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	2	6	3	1	3
Elec-TDC-Mark Murphy	DHM	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-017-Paul Tierney	FH2	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-TDC-Mark Murphy	fx1N-14MR	None	None	None	0	0	0	0	0
Elec-TDC-Mark Murphy	fx1N-24MR	None	None	None	0	0	0	0	0
Elec-TDC-Mark Murphy	ILM1332A	None	None	None	0	0	0	0	0
Elec-TDC-Mark Murphy	Kart Stand	Mechanical - heavy equipment	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	1	1	1	1	1
Elec-TDC-Mark Murphy	KMP4120DL	Electrical - improper use may lead to injury.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-TDC-Mark Murphy	KMP5406DL	Electrical - improper use may lead to injury.	Only users instructed in the proper use of the instrument are permitted to use the item.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-TDC-Mark Murphy	Nexa1200	Chemical - potentially explosive substance	Only users instructed in the proper use of the instrument are permitted to use the item.	Standard Operating Procedure to be defined in respect of use and maintenance.	1	3	3	1	3
Elec-TDC-Mark Murphy	PP23LA	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-TDC-Mark Murphy	PRO4-S	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	Safety notice inserted student manual regarding conditions of equipment use.	1	2	2	1	2
Elec-TDC-Mark Murphy	RS163-5348	None	None	None	0	0	0	0	0
Elec-TDC-Mark Murphy	Training Carousel	Mechanical - heavy equipment	Only users instructed in the proper use of the instrument are permitted to use the item.	Standard Operating Procedure to be defined in respect of use and maintenance.	2	4	2	1	2
Elec-TDC-Mark Murphy	Training Carousel	Electrical - improper use may lead to injury.	Only users instructed in the proper use of the instrument are permitted to use the item.	Regular inspection of mains cables and testing of MCB. Safety information in student handbooks.	2	4	2	1	2
Elec-TDC-Mark Murphy	SMP48400	Chemical - potentially explosive substance if used with plasma assisted hydrogen, Browns gas or hydrogen electrolysis.	Supervised access and use only by authorised and qualified personnel.	Locked storage. Use only permitted under supervision and following demonstration by qualified personnel.	2	6	3	1	3
Elec-TDC-Mark Murphy	SMP48400	Mechanical - high speed moving parts	Supervised access and use only by authorised and qualified personnel.	Locked storage. Use only permitted under supervision and following demonstration by qualified personnel.	2	4	2	1	2

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-TDC-Mark Murphy	SMP48400	Electrical - high current (~400A)	Wiring to be made with no power applied.To be installed & operated by competent ITT staff members only in accordance with manufacturer specifications.	Warning labels to be fixed to vehicle, users to refer to manufacturer safety documentation. Protective eyewear to be worn if operating exposed controller.	2	6	3	1	3
Elec-TDC-Mark Murphy	TEPTF1	Mechanical - cutting tool	Equipment mounted on metal racks within a metal enclosure, which is mounted on frames. Students instructed to not to connect panel equipment to mains electrical supply.	Students to be supervised whne using the panels. Use of hazard signage in vicinity of the panels. Academic staff to incorporate safety information within student lab worksheets. Operator manuals available to users.	2	4	2	1	2
Elec-TDC-Mark Murphy	TEPTF1	Physical - crush injury (feet).	Hazard signage deployed in vicinity of frame.Students and staff instructed of hazard.	None	1	2	2	1	2
Elec-TDC-Martin Fogarty	TBS1102B	Electrical - 240v mains power exposure if main covers removed.	Staff and students notified NOT to attempt repairs or to dismantle equipment. Technical staff only to attempt or authorise repairs or modifications. Lab power supply protected by MCB.	None	1	2	2	1	2
Elec-TDC-Mark Murphy	CC-100L	Mechanical - heavy-duty cutting tool.	None	Avoid use of cutter in restricted, poorly-lit areas. Gloves and eye-protection to be worn. Cordon area from bystanders. Safety footwear to be worn. Lecturing staff to prescribe precautions within student lab worksheet.	2	4	2	1	2
Elec-TDC-Mark Murphy	PCC250	Mechanical - heavy-duty cutting tool	None	Avoid use of cutter in restricted, poorly-lit areas. Gloves and eye-protection to be worn. Cordon area from bystanders. Safety footwear to be worn. Lecturing staff to prescribe precautions within student lab worksheet.	2	4	2	1	2

Identifier	Model	Hazard	Existing Control	Recommended Control	EL	ER	S	RL	RR
Elec-TDC-Mark Murphy	ACS380	Electrical - high current	Securely mounted within a metal enclosure.	Hazard signage deployed. Supervised use only permitted.	1	3	3	1	3

STANDARD OPERATING PROCEDURE

Organisation:	**TU Dublin - Tallaght**
Section:	**School of Engineering**
Procedure Name:	**Code of Conduct for Technician Development Centre (TDC)**
Procedure No:	**E2070**
Revision:	**A**
Prepared By:	**Mark Murphy**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	Mark Murphy Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 Users are not permitted to effect repairs or modifications to laboratory equipment. Only ITTD Technical support staff and/or ITTD authorised agents are permitted to effect equipment repairs and/or modifications.

6.16 It is a condition of use of laboratory ***TDC***, that all users must comply, where required, with the following lab specific Standard Operating Procedures.

E2060 (TDC_Carousel Cable Change)
E2061 (TDC_Phase4 Testing)
E2062 (TDC_Phase6 Testing)
E2063 (TDC_Turning Carousels)
E2064 (TDC_Working on Live Panels)
E2065 (TDC_C8)
E2066 (TDC_C2)
E2088 (TDC_C3)
E2089 (TDC_Electrical Workshop)

These procedures are available from the responsible technical officer.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

STANDARD OPERATING PROCEDURE

Organisation: QR Ar _ifk *Q^ii^deq

Faculty: **SCHOOL OF ENGINEERING**

Procedure Name:	**Electrical Carousel Cable Change**
Procedure No:	**E2060**
Revision:	**A**
Prepared By:	**Mark Murphy**
Date:	**01/10/2010**
Approved By:	**James Wright**
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A	_	18/10/2010	1/10/2010 M Murphy	14/10/2010 James Wright	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that cable reels are changed in a safe manner on the electrical carousels.

2.0 PURPOSE

The purpose of this procedure is to outline to staff a safe method of changing cable reels on the electrical carousels.

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of Department of Electronic Engineering to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Ensure cable carrying bar is in correct position with retaining bolts and nuts fitted.

6.2 Ensure nobody is working or standing below or very close to carousel, continue to monitor this during the following steps.

6.3 Move mobile platform into position under the bolt release area of the bar.

6.4 Ensure platform is level and front step is in proper seated position.

6.5 Place new cable reels on top of electrical panel.

6.6 Walk up steps holding the hand rail.

6.7 Stand on top platform in comfortable position and release retaining nut and bolt, store nut safely.

6.8 Lift cable bar up straight and change cable reels, place empty reels on top of electrical panel.

6.9 Reseat cable bar and refit retaining nut and bolt after changing cable reels.

6.10 Walk down steps holding rails then remove platform with front step in transport position.

6.11 Remove old cable reels for proper disposal.

6.12 Protective footwear must be worn during this procedure.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

STANDARD OPERATING PROCEDURE

Organisation: QR Ar _ifk *Q^ii^deq

Faculty: **SCHOOL OF ENGINEERING**

Procedure Name:	**Testing Phase 4 Practical Work at the Electrical Carousels**
Procedure No:	**E2061**
Revision:	**A**
Prepared By:	**Mark Murphy**
Date:	**01/10/2010**
Approved By:	**James Wright**
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A	_	18/10/2010	1/10/2010 M Murphy	14/10/2010 James Wright	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that the testing of Phase 4 Practical work at the electrical carousels is carried out safely.

2.0 PURPOSE

The purpose of this procedure is to outline to staff a safe method of testing Phase 4 practical work at the electrical carousels

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of Department of Electronic Engineering to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Before testing always ensure that the electrical panel is dead and there are no items that may cause danger sitting on top or inside panel (drinks, heavy objects, loose cables, tools etc), ensure that cable reels are wound back if cable ends are hanging too low from cable bar. ,

6.2 Ensure the student has used the multimeter to check wiring against the schematic drawing (use ITT provided multimeter with fused leads).

6.3 Supervise the student making some further continuity checks with the multimeter.

6.4 Carry out visual and physical inspection of earthing and bonding connections.

6.5 Carry out visual and physical inspection on power and control wiring for bad or dangerous connections.

6.6 Ensure safety devices are fitted if required (mechanical interlocks) * and components are properly rated and set (fuses, mcb's, contactors, overload relays).

6.7 Ensure the panel isolator and protective devices (mcb's, fuse carriers) are in off position.

6.8 Lock the electrical panel door.

6.9 Take a 3 phase power lead and key from the locked cabinet or electrical stores (Key and lead must not be left unsupervised and should be returned to locked cabinet if not in used).

6.10 Plug in or ask the student to plug the 3phase lead into the panel inlet, insert the other end of the lead into the carousel power panel and energize the panel with the key.

6.11 Stand on the safety rubber mat, open the electrical panel door and switch on the panel isolator.

6.12 Switch on the control circuit protective device (mcb, fuse carrier).

6.13 Test functionality and operation of the control circuit.

6.14 Switch off the protective devices then isolator then power key and then remove the power lead.

6.15 Prove the panel is electrically dead before asking the student to connect up a motor or rework on the panel (rework may be required if step 6.13 is not correct).

6.16 Steps 6.4 to 6.15 should be repeated if a student has reworked or modified wiring in a panel.

6.17 When the student has connected the motor, check that the correct type of motor is connected and the wiring is correct (trolley bonding lead must be connected to the carousel frame) *.

6.18 Ensure the panel isolator and protective devices (mcb's, fuse carriers) are in off position.

6.19 Close panel door.

6.20 Take the 3 phase lead and power key , Plug in or ask the student to plug the lead into the electrical panel inlet ,insert the other end of the lead into the carousel power panel and energize the panel using the key.

6.21 While standing on safety rubber mats open the door of the electrical panel and close the panel isolator.

6.22 Switch on the control circuit protective devices and then the power circuit protective devices.

6.23 Test operation of the power circuit.

6.24 When the circuit is tested, de-energize the circuit and switch off protective devices and open the panel isolator.

6.25 Turn off the power key switch and remove the power lead and key.

6.26 Ensure the panel is electrically dead (prove dead) before stripping out the panel or reworking on the panel (rework may be required after step 6.23).

6.27 Repeat steps 6.17 to 6.28 if the power wiring in the panel has been reworked.

6.28 Ask the student to leave the electrical lab in the same condition it was found.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

STANDARD OPERATING PROCEDURE

Organisation: **TR Ar_ifk *Q^ii^de q**

Faculty: **SCHOOL OF ENGINEERING**

Procedure Name:	**Testing Phase 6 Practical work at the Electrical Carousels**
Procedure No:	**E2062**
Revision:	**A**
Prepared By:	**Mark Murphy**
Date:	**04/10/2010**
Approved By:	**James Wright**
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A	_	18/10/2010	4/10/2010 M Murphy	14/10/2010 James Wright	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that the testing of Phase 6 Practical work at the electrical carousels is carried out in a safe manner.

2.0 PURPOSE

The purpose of this procedure is to outline to staff a safe method of testing Phase 6 practical work at the electrical carousels

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of Department of Electronic Engineering to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Student should be asked to carry out wiring and testing with the aid of documentation and the **PLC Wiring Safety Procedure Rev 2.1** provided by ITT.

6.2 Student should be asked to carry out all tasks from step 1 to 7 of the PLC **Wiring Safety Procedure Sheet** and tick the appropriate boxes to confirm completion of tasks.

6.3 Ensure that all these tasks have been completed satisfactorily before ticking the appropriate box on the sheet therefore allowing the student to continue to the next step and completion.

6.4 Prove the circuit is electrically dead before any work or rework is carried out on the panel or motor connections.

6.5 Confirm that all safety devices (mechanical interlocks) *are fitted if necessary and that all components are correctly rated and set.

6.6 Remove any items from the top of or in the electrical panel that might cause danger (heavy tools, drink bottles, cups, loose cables); wind back cable reels if cable is hanging down too low from cable bar.

6.7 Power leads and keys should be stored in locked cabinet or electrical stores if not in use.

6.8 Electrical lab should be left in the same condition as it was found.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

* Refer to **Staff Workshop Guide** stored in Electrical Lab TDC, also Staff Drive: **Z/Elec/Staff**

STANDARD OPERATING PROCEDURE

Organisation: **TR Ar_ifk *Q^ii^de q**

Faculty: **SCHOOL OF ENGINEERING**

Procedure Name:	**Turning Electrical Carousel**
Procedure No:	**E2063**
Revision:	**A**
Prepared By:	**Mark Murphy**
Date:	**01/10/2010**
Approved By:	**James Wright**
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A	_	18/10/2010	1/10/2010 M Murphy	14/10/2010 James Wright	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that the electrical carousels are rotated in a safe manner.

2.0 PURPOSE

The purpose of this procedure is to outline to staff a safe method of turning (A) The electrical carousel main frame (B)The electrical carousel individual work boards.

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of Department of Electronic Engineering to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1A Ensure all locking pins are in correct position.

6.2A Ensure no persons or obstacles are close to or under the carousel, continue to monitor this.

6.3A Ensure all doors are properly locked and all loose items are removed from electrical panels.

6.4A Open locking pin on opposite side to padlocked side, then open the padlock.

6.5A Hold carousel handles firmly before opening locking pin on padlock side.

6.6A Slowly rotate carousel main frame keeping hands clear of side area of frame.

6.7A When carousel is in correct position, close locking pins and padlock.

6.8 B Individual carousel boards should only be rotated by two staff members.

6.9B Hold carousels handle firmly and ensure hands are not placed on the side of frame.

6.10B Release the bottom locking pins.

6.11B Agree who will release the last pin and continue to releasing upper pins.

6.12B Carefully rotate board keeping hands on the handles and clear of side of board.

6.13B Close all four locking pins after rotating the carousel board.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

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Refer to "Carousel Safety" document stored in Electrical Lab in TDC and Staff drive:Z/Elec/Staff

STANDARD OPERATING PROCEDURE

Organisation: **TR Ar_ifk *Q^ii^de q**

Faculty: **SCHOOL OF ENGINEERING**

Procedure Name:	**Working at a live panel at the electrical carousels**
Procedure No:	
Revision:	
Prepared By:	**Mark Murphy**
Date:	**04/10/2010**
Approved By:	**James Wright**
Date:	**14/10/2010**

E2064
A

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
A	_	18/10/2010	4/10/2010 M Murphy	14/10/2010 James Wright	Initial Release

1.0 POLICY

It is the policy of the School of Engineering that working at a live panel at the electrical carousels is carried out in a safe manner.

2.0 PURPOSE

The purpose of this procedure is to outline to staff a safe method of working at a live panel at the electrical carousels.

3.0 ORGANISATIONAL UNITS AFFECTED

School of Engineering

4.0 DEFINITIONS

Manipulative live working: Moving, modifying, removing conductors or components while live.

Direct Supervision: One to one supervision while a process is taking place.

5.0 RESPONSIBILITY

It is the responsibility of the Head of Department of Electronic Engineering to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Students carrying out testing, programming and taking electrical readings at a live panel should only be carried out under the direct supervision of a suitably qualified competent member of staff, no manipulative live working is permitted *.

6.2 Remove any dangerous items from inside or the top of the panel before working on the panel (heavy tools, bottles etc).

6.3 "Prove dead "the electrical panel before connecting motors or working on the panel.

6.4 Safe earthing , bonding and wiring must be confirmed before applying power to the panel.

6.5 Switch off all mcb's, fuse carriers and panel isolator before closing the panel door.

6.6 Connect the power lead into the electrical panel inlet and the other end of the lead to the carousel power panel (Power lead and carousel power keys are stored in the locked cabinet or the electrical stored, they should not be left unsupervised and must be returned if not in use).

6.7 Energize the panel by means of the key switch.

6.8 Stand on the safety rubber mats before opening electrical panel door.

6.9 Close isolator and circuit protection devices as required.

6.10 Carry out electrical tests, readings, programming as required ** (only use ITT supplied equipment for testing).

6.11 When step 6.10 is completed, switch off the circuit protection then isolator then key switch and then remove power lead

6.12 Prove the circuit is electrically dead before working on it again

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the '*Generation of new SOPs and update and revision of existing SOPs DR001'*.

* manipulative working on a panel or connecting motors etc should **not** be carried out while a power lead is connected between the student panel and the power panels (even if the key switch ,isolator or circuit protection are in the off position)

** A student must never be left without direct supervision at a live panel.

Further information can be found in the **Staff Workshop Guide** stored in the Electrical Lab(TDC) and Safety sheets stored on the **Staff Drive:z/Elec/staff**

STANDARD OPERATING PROCEDURE

Organisation: **TU Dublin -Tallaght**

Section: **Institute (All sections)**

Procedure Name:	**Laboratory TDC-C8: Terms of Use**
Procedure No:	E2065
Revision:	**A**
Prepared By:	**John Fox**
Date:	**October 2010**
Approved By:	
Date:	**15th October 2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	J Fox Oct2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this document is to outline the recommended procedures involved, which are to be implemented in order to use Laboratory TDC-C8 in a safe and purposeful manner.

3.0 ORGANISATIONAL UNITS AFFECTED

All

4.0 DEFINITIONS

Motors:	Electrical machines commonly classed as motors
TQ Test Beds:	Specific piece of equipment used within the Laboratory for testing/experiments.

5.0 RESPONSIBILITY

It is the responsibility of the Head of Function to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

The Laboratory TDC-C8 is a purpose built lab predominately used to demonstrate the use of motors within a controlled environment by course of laboratory experiments. The following outlines the procedures to be adhered to when using the Laboratory;

6.1. Students may not access this laboratory without being accompanied by a trained member of staff.

6.2. All test equipment with Laboratory TDC-C8 must be used under supervision by a trained member of staff at all times.

6.3. Specifically when using the TQ test beds the following procedures outlined must be adhered to:

6.3.1 Power to the TQ test beds is supplied via key switch. Only trained members of staff have the authority to access the key, in which case, they may only operate the key switch to supply power to the TQ test beds.

6.3.2.Prior to supplying power to TQ test beds via the key switch, a check must be made to ensure the TQ test beds are in a "power off" state via each test beds individual power switch.

6.3.3. Only trained members of staff are permitted to place a motor into the TQ test bed cradle and connect the motor to the test bed.

6.3.4. Each TQ test bed must always be in a "power off" state when placing a motor to be tested in the test bed cradle. The motor must be correctly placed and the motor guard must be in the correct position to cover the motor under test.

6.3.5. When motors have been tested under a load using the TQ test bed, the outer case is often hot to the touch. The TQ test bed must be in the" power off" state prior to removing the motor from its cradle and adequate time must be allowed to enable the motor to cool. Great care must be exercised when removing the motor from its cradle.

6.3.6. With regards to the TQ Equipment within the lab; when completing a circuit template under instruction by a trained member of staff, shrouded connectivity cables/leads must only be used.

6.3.4. Lab-specific procedures for LabC8:- none

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

STANDARD OPERATING PROCEDURE

Organisation TU Dublin - Tallaght

Section: **School of Engineering**

Procedure Name:	**Code of Conduct for Engineering Laboratory C2 ĦDC▫**
Procedure No:	E2066
Revision:	**A**
Prepared By:	John Fox
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	John Fox Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory Lab C2, that all users must comply with the following lab specific Standard Operating Procedures.

None

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

7.2 This protocol will be subject to review at the end of each academic year to reflect any change in Institute, School, or Department policy or any identified error, omission, or improvement.

7.3 All changes will be carried out in accordance with the policy for the *'Generation of new SOPs and update and revision of existing SOPs DR001'*.

STANDARD OPERATING PROCEDURE

Organisation:	**INSTITUTE OF TECHNOLOGY TALLAGHT**
Section:	**School of Engineering**
Procedure Name:	**Code of Conduct for Engineering Laboratory TDC_C3**
Procedure No:	E2088
Revision:	**A**
Prepared By:	**John Fox**
Date:	**September 2010**
Approved By:	
Date:	**14/10/2010**

REVISION HISTORY					
Rev	Reason for change	Effective from	Prepared date/by	Approved date/by	Description of change
	-	Immediate	J.Fox Sept 2010		

1.0 POLICY

The School of Engineering provides and maintains laboratories for the purpose of supporting courses run by the School. In order to ensure a safe, learning environment, and to maintain the high standard and quality of laboratory and classroom resources, all users of School laboratories are required, at all times, to comply with the School of Engineering policy outlined below.

2.0 PURPOSE

The purpose of this procedure is to outline to the Institutes staff the proper code of conduct to be observed by all users of the School of Engineering Laboratories. Hazard identification and control sheets associated with this lab are contained in apprendix A.

3.0 ORGANISATIONAL UNITS AFFECTED

All units

4.0 DEFINITIONS

None

5.0 RESPONSIBILITY

It is the responsibility of the Head of School and Heads of Department (Electronic and Mechanical) to ensure compliance with this procedure.

6.0 DESCRIPTION OF PROCEDURE

6.1 Eating and/or drinking in laboratories is not permitted at any time.

6.2 School resources should not be used to download, distribute and/or play games, music or videos.

6.3 School resources must not be used to download, distribute and/or view material, likely to cause offence to others.

6.4 All litter must be disposed of properly in the appropriate bins provided. Recyclable material should be disposed of in the recyclable bins.

6.5 Modification and/or repairs to laboratory equipment or computers must only be performed by ITTD technical support staff or external authorised contractors.

6.6 All persons using the laboratory and its resources must do so with due regard for other users and must behave in a manner that will not cause offence or disruption.

6.7 Laboratory resources must be used for legitimate coursework purposes and authorised activities only.

6.8 It is a condition of use of the laboratory, that users maintain a safe and tidy workspace. On completion of work, users must leave their workspace tidy (all equipment and accessories must be switched off and returned into storage, where applicable, and any waste material must be disposed of in the correct manner). Computer users should logout. Return chairs and any laboratory furniture to their correct positions.

6.9 Laboratory equipment, tools and materials must be used in a proper and responsible manner at all times. If in doubt, consult the supervising lecturer or laboratory technician.

6.10 Where required, users must comply with the wearing of personal protective clothing and accessories, such as safety goggles.

6.11 Laboratory users are obliged to immediately report to the supervising lecturer or laboratory technician, all accidents or equipment faults or damage.

6.14 It is a condition of use of a laboratory that all users must comply with any instructions issued by authorised ITTD staff to ensure best and safe practice within the laboratory environment.

6.15 It is a condition of use of laboratory *TDC_C3*, that all users must comply with the following lab specific Standard Operating Procedures.

None

These procedures are available from the technical officer responsible for the laboratory.

7.0 REVISION OF THIS PROTOCOL

7.1 Where an error, omission, or possible improvement to this protocol is identified by any member of staff, that information should be brought to the attention of the HOD / HOS as soon as possible in order that this protocol may be revised immediately.

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